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# The Canadian Builder and Carpenter

Published Monthly by The Commercial Press, Limited, 32 Colborne St.

C A Bradshaw
183 Davenport Rd
TORONTO ONT.

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OF TORONTO

"I Tell You It's A Great Saw"

Believe your "Uncle Si" when from the wealth of his years of experience he advises that Carpenters buy Simonds Hand Saws.

They are sold by leading Hardware Dealers; if your dealer cannot accommodate you, we will, direct from our Montreal factory.

Every Simonds Hand Saw is made of the highest grade steel, and has teeth which will hold a cutting edge through severe service. Each handle is of especially selected thoroughly seasoned wood, correctly shaped and highly polished.

"Satisfaction or money back" is our liberal guarantee.

Simonds No. 10½, 26-inch, $2.00. No. 8, 26-inch, $2.25. Any desired point, cross-cut or rip tooth.

SIMONDS SAW

"Pronounced Si-monds"

Simonds Canada Saw Co.
LIMITED
St. Remi St. & Acorn Ave.
Montreal, Que.

*Branches:*
St. John, N. B.
Vancouver, B.C.

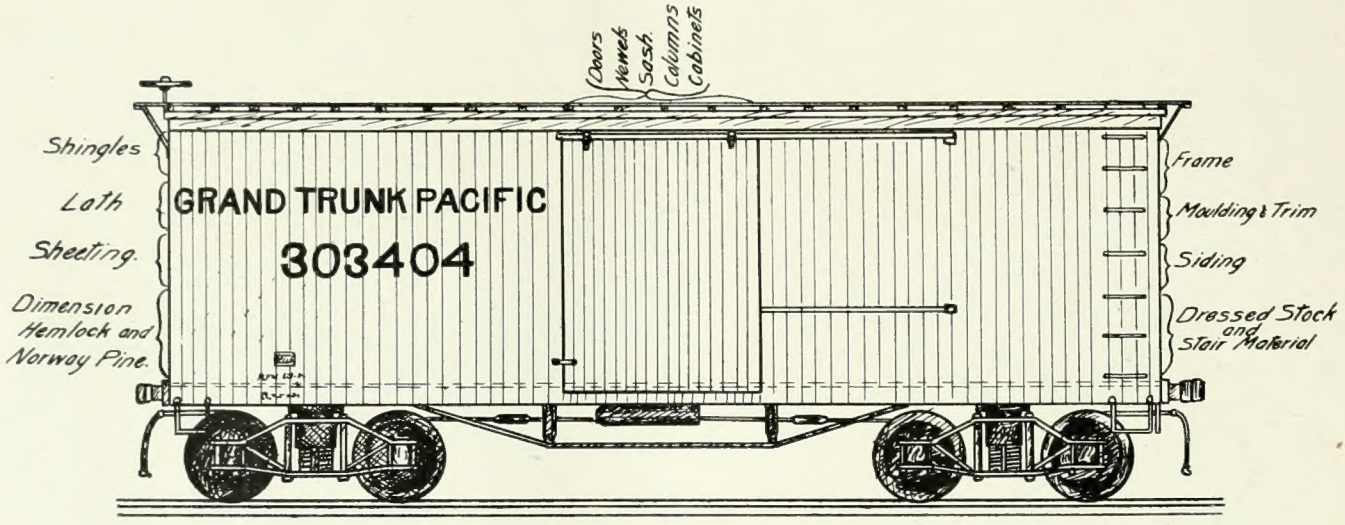
# Midland Planing Mill Products

**The Leading Stock Lines**

# DO YOU KNOW

that we supply mixed car lots at

# WHOLESALE PRICES?




Send us your lists for quotations, F.O.B. your station, or let us have our representative call without obligation to you. He is in your district now, and is a practical man who may have some good suggestions of help to you.

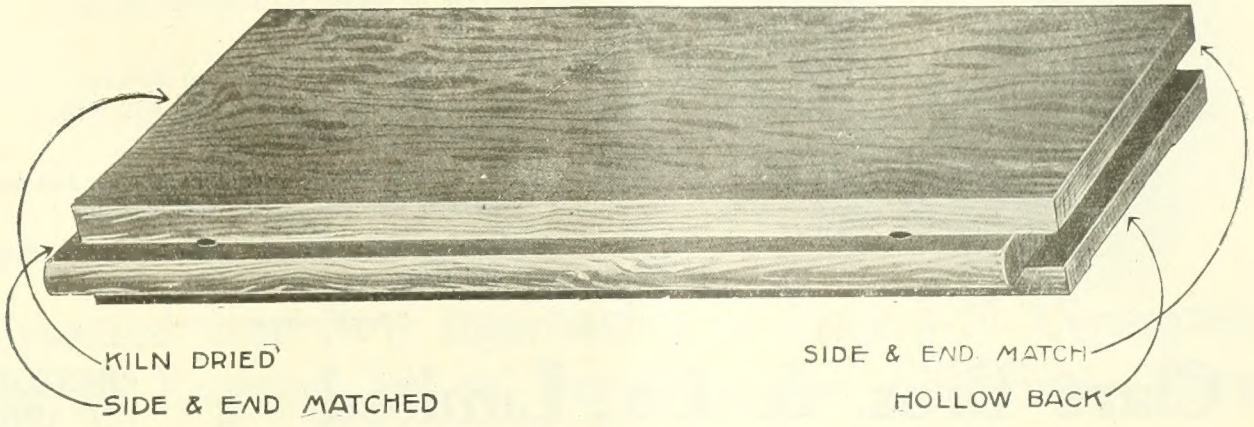
# Georgian Bay Shook Mills, Limited

**MANUFACTURERS FROM THE TREE TO THE FINISHED PRODUCT**

**Midland, Ontario**

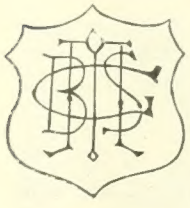
# Midland Planing Mill Products

**The Leading Stock Lines**




What is the most noticeable wood-work in a room?
What good quality wood-work adds most to the general appearance of a room?
What is the most used and most abused wood-work, and what wood-work, if not of good quality, continually shows it? *Hardwood Flooring.*
Then, why not buy the best flooring, *especially when it costs no more?*
And, to get the BEST, you must buy from us—if not direct, look for our trade-mark on the back of each piece—and be sure you get it.
Our flooring is thoroughly kiln-dried, tongued and grooved, end-matched, hollow backed, assorted to lengths, stamped and tied with wire.
Each piece has our trade-mark on the back, which means that we guarantee absolutely.
The machining of the flooring is perfect. The workmen are experts, and work at the best machines possible to procure, under expert supervision.

MIDLAND



BRAND

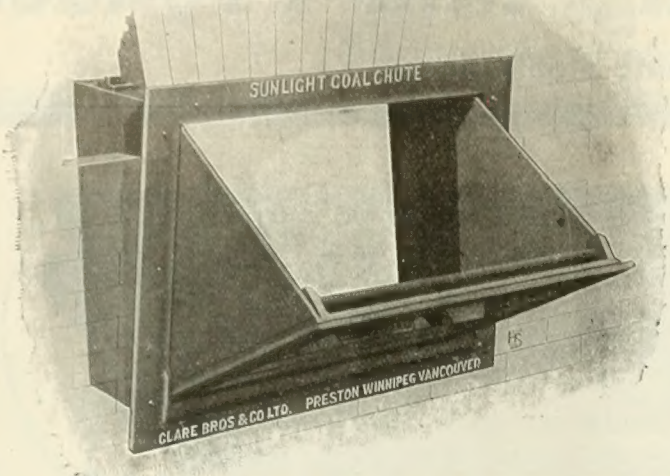
This flooring is made in thicknesses of 3/8" and 13/16", Maple, Birch, Plain Oak and Quarter Cut Oak, and in 9/16 and 13/16 Beech.
This flooring has established a world-wide reputation for its appearance and service, and has been used in many of the large Public Buildings, as well as Residences throughout the country.
Now is the time to order your flooring. You will buy more cheaply during the next few months than probably during your life-time again. If you want to take advantage of this, send us your lists for quotations.

***Send for Samples of Canadian Native Woods***

# Georgian Bay Shook Mills, Limited

**MANUFACTURERS FROM THE TREE TO THE FINISHED PRODUCT**

**Midland, Ontario**




# The Window Chute

is no longer a luxury but a recognized necessity in every up-to-date building.

**Open**—It's a chute through which fuel can be put into the basement with ease and convenience.

**Closed**—It's a window that locks automatically and can be opened only from the inside.

**A Basement Window** used for taking in fuel must be continually repainted, repaired and reglazed.

**A Window Chute** needs no repairs and is always neat and clean.

***Prices sent on request.***

## Clare Bros. & Co., Limited :: PRESTON ONTARIO

**Manufacturers of HECLA FURNACES, PENINSULAR RANGES**

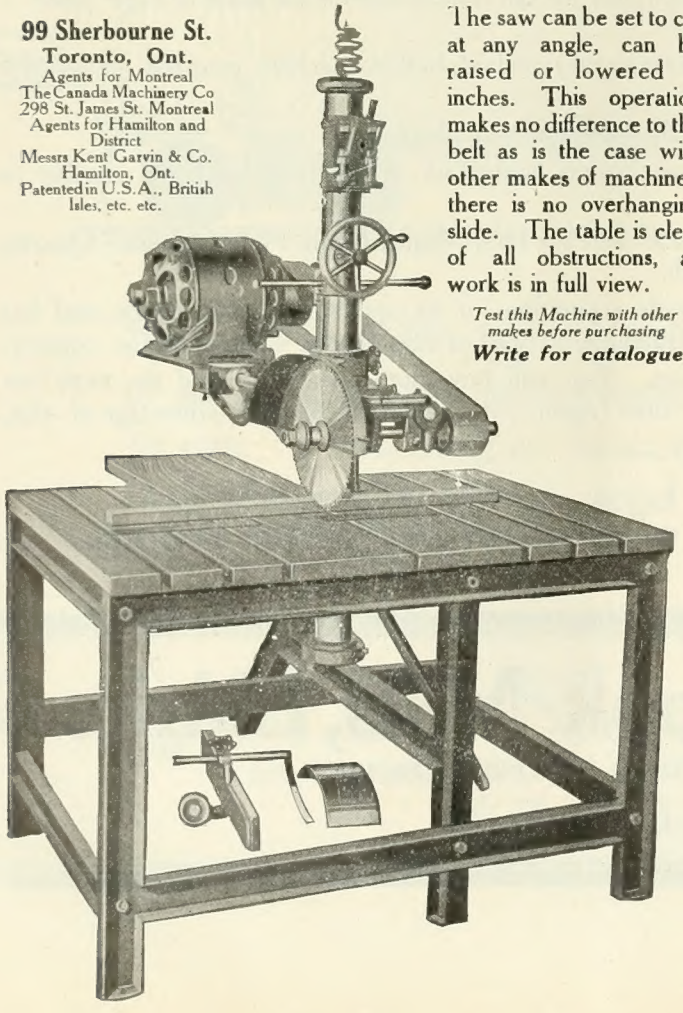
CLARE & BROCKEST, Limited, Winnipeg
REYNOLDS & JACKSON, Calgary
RACE, HUNT & GIDDY, Edmonton
J. M. KAINS & CO., Vancouver

## The Hutchinson Combination Woodworker

**99 Sherbourne St.**
**Toronto, Ont.**
Agents for Montreal
The Canada Machinery Co
298 St. James St. Montreal
Agents for Hamilton and District
Messrs Kent Garvin & Co.
Hamilton, Ont.
Patented in U.S.A., British Isles, etc. etc.

The saw can be set to cut at any angle, can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines; there is no overhanging slide. The table is clear of all obstructions, all work is in full view.

*Test this Machine with other makes before purchasing*
***Write for catalogue***



## You Can Build Beautiful Buildings

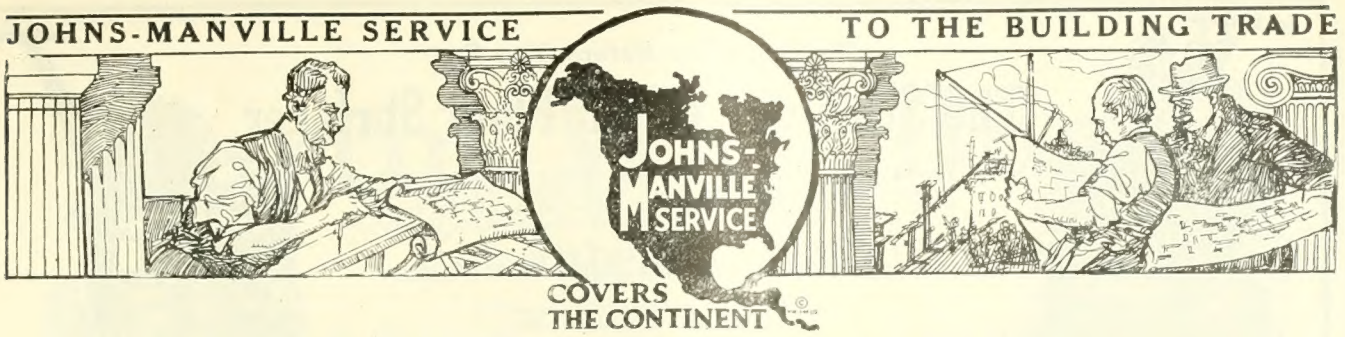
(as well as strong, fireproof) if you use granite faced cement blocks. These are made with rock and smooth finish in the following sizes:

| | |
|---|---|
| 8 x 8 x 16 | 4 x 8 x 8 |
| 8 x 8 x 8 | 12 x 8 x 16 |
| 12 x 8 x 8 | |

These blocks are mechanically mixed, are well cured and stand up well under severest conditions. Being waterproof the blocks maintain their beautiful appearance. We will gladly show you the blocks at our factory or send you full particulars on request.

## Granite Concrete Block Co.

**Cor. Yonge Street and St. Clair Ave.**
**TORONTO**



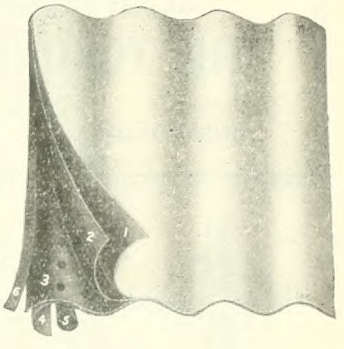

J-M Service is a Two-fold Application of J-M Responsibility. It insures Satisfaction to Your Customer and Protection to You.

Every J-M Product is intended to render full service to the user; and it must justify the builder who recommends or applies it. This is J-M Responsibility.

We are ready at all times to "make good" this responsibility to your customers and to protect your interests in every specification or sale of J-M Products.

To make this J-M Responsibility possible "J-M Service covers the Country."

# Galvanized Iron Now Approaches in Price J-M Corrugated Asbestos Roofing, but in Durability and Efficiency---Never



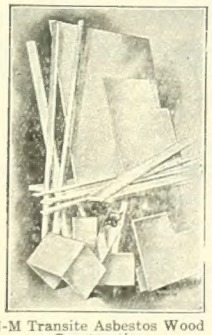
The demand for war material has "sky-rocketed" the price of zinc and has raised the price of galvanized corrugated iron until it now approaches the price of J-M Corrugated Asbestos Roofing.

This present similarity in price is their only point of likeness. For J-M Corrugated Asbestos Roofing is practically indestructible and will still be good for many years of efficient roofing service after galvanized iron has rusted out and gone to pieces.

J-M Corrugated Asbestos Roofing is made with a corrugated sheet iron reinforcement enclosed in an envelope of waterproofed Asbestos Fabric, cemented together and sealed air-tight by a Trinidad Lake Asphalt compound. It never needs coating or painting or any other attention, it forms a roof under which you can live in hottest weather, and may be applied direct to wood or iron framing wherever galvanized iron would be ordinarily used. Its Full Service is assured by the J-M Roofing Responsibility.

We invite a comparison of our quotations on J-M Corrugated Asbestos Roofing with the current market quotations on ordinary galvanized corrugated iron. It will be to your advantage to investigate the cost and service of J-M Corrugated Asbestos Roofing before you pay present prices for galvanized iron to fill your roofing requirements.

Let us quote you. Compare our Prices with Galvanized Iron Prices and—then compare their Service.



J-M Transite Asbestos Wood Construction

# J-M Transite Asbestos Wood is an ideal fire barrier for exterior or interior use

When exposed to the weather in general outdoor use, it is impervious to the effects of the elements, and even becomes tougher with exposure.

J-M Transite Asbestos Wood can be sawed, nailed and otherwise handled like wood, and can be grained and finished to match surrounding trim if desired.

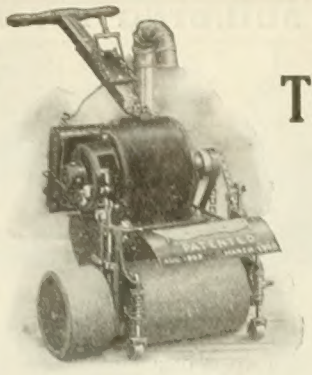
Write for booklet, covering this subject. It will be a splendid thing to have on file.

# The Canadian H. W. Johns-Manville Co., Limited

**Manufacturers of Pipe Covering, Asbestos Stucco, Cold Storage Insulation, Waterproofing, Sanitary Specialties, Acoustical Correction, Cork Tiling, Etc.**

**Toronto** **Montreal** **Winnipeg** **Vancouver**

3172A 3187C 3072F



WOOD

*Test and Try Before You Buy*

## The Schlueter Rapid Floor Surfacer

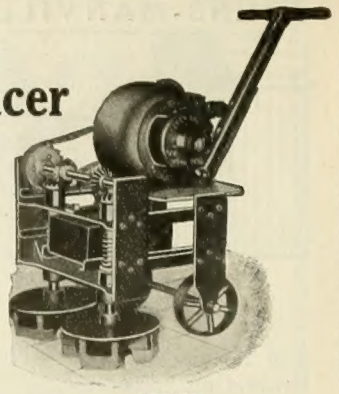
The Schlueter BALL BEARING electric floor surfacing machines for mosaic, marble, composition and wood floors are the most simple constructed machines on the market. Direct chain drive AUTOMATIC DUST COLLECTORS. No gears or clutches to wear. Made in various sizes, using 1, 1½, 2, 3 H.P. Motors.

**OVER 15,000 IN USE ALL OVER THE WORLD**

*Send for prices and free trial proposition*
*Sold by Leading Canadian Jobbers*

## The M. L. Schlueter Company

225 W. Illinois Street, Chicago



STONE

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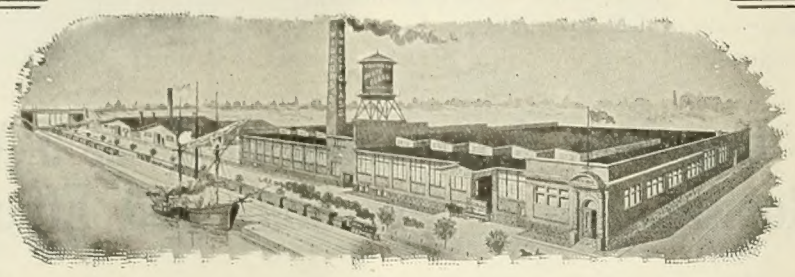
RED **S** BRAND WINDOW GLASS



GLASS BENDERS TO THE TRADE

## THE TORONTO PLATE GLASS IMPORTING COMPANY, LIMITED

DON ROADWAY

Plate, Window, Figured, Stained, Wired, Bent, Mirror and Ornamental Glass

TORONTO

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## Page Concrete Reinforcement in Flat Sheets

### For Concrete Road Pavement, Building Floors, Sewer Pipes, Etc.

We are the *originators* of this wire reinforcement in sheets, and it is coming into universal use wherever introduced. We have supplied many carloads of it this past season.
The standard mesh for road pavement is 6 x 12 inches; for bridges and building floors, a 3 x 6 or 3 x 12 inch mesh is generally used. We can supply a great variety of weights and sizes of meshes. In sheets up to 6 feet wide, and any length specified that can be loaded in cars.

**Samples Will Be Sent Upon Request**

*We also supply Iron Fences, Fire Escapes, Office Wire Work and all kinds of Builders' Wire and Iron Work*

## The PAGE WIRE FENCE COMPANY, Limited

1138 King St. W. TORONTO | 506 Notre Dame St. W. MONTREAL | 88 Church St. WALKERVILLE | 40 Dock St. ST. JOHN, N.B. | 101 James St. E. WINNIPEG

### Can be Supplied in Rolls if Preferred

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## Five Reasons for Subscribing to The Canadian Builder

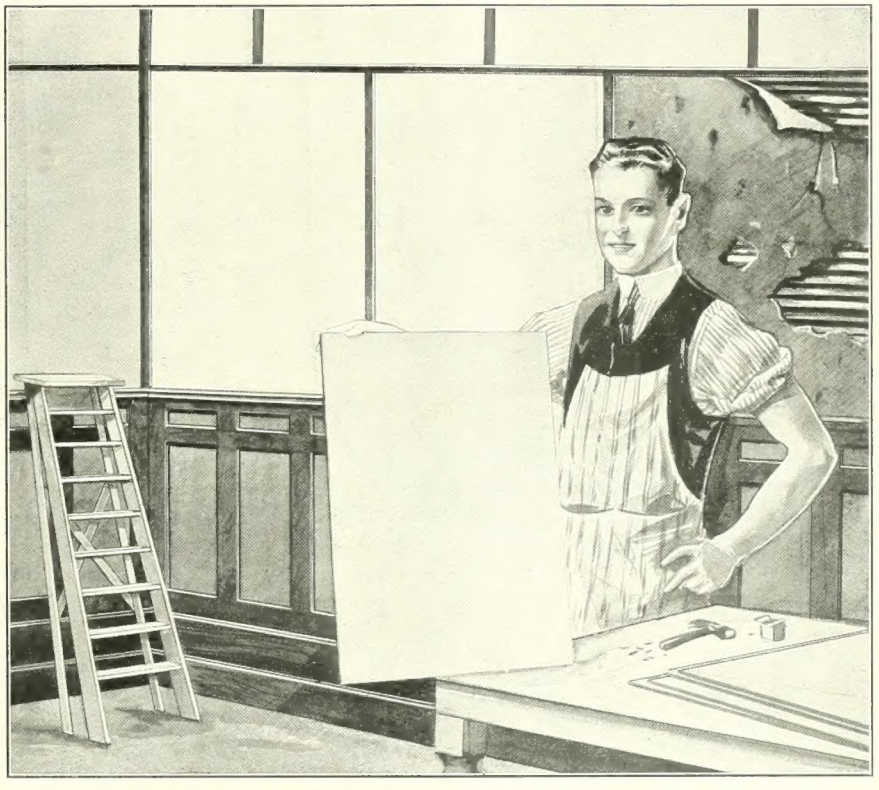
It publishes plans of actual buildings suitable for erection by the average builder. It aims at raising the standard of the trade in Canada. It contains items of practical value in every department of the trade. It furnishes special articles by leading experts every month. It gives news of Builders' Exchanges throughout the country.

# Martin Wall Board

## For Interior Finish

**Absolutely Sanitary** **Easy to Put Up**
**Fire Resisting** **Easy to Decorate**
**Cheaper than Lath and Plaster**

*Made in Canada*



*By A Canadian Firm*

**Making an Old Room New**

The new Martin Wall Board is made from pure, clean wood fibre by accurate machinery specially designed for the process, which makes it such an ideal interior finish for walls and ceilings in any building, old or new.

Special hardening process causes the board to improve with age.

The Board is finished smooth on one side and burlap finish on the other, giving the user a choice.

*If you are not already using it*
*write us for a sample of the board*

## Martin Corrugated Paper & Box

**Company, Limited**

**353 Pape Avenue, Toronto**

WEST
BATTS LIMITED
TORONTO

# BATTS' STAVED COLUMNS

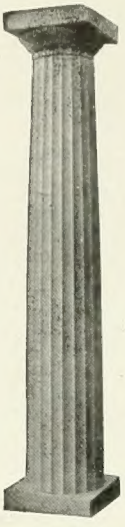
## BUY GOODS "MADE IN CANADA"

(WE MANUFACTURE ALL OUR OWN GOODS)

Design B. L. No. 1

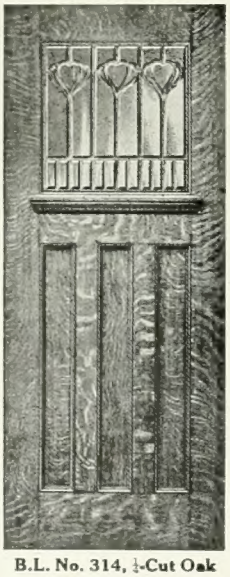
Design B. L. No. 3

Design B. L. No. 4



Design B. L. No. 6

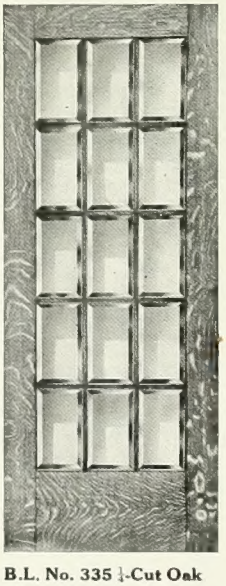
## DETAIL WORK A SPECIALTY



B.L. No. 314, ¼-Cut Oak

B.L. No. 316, Chestnut

B.L. No. 334 ¼-Cut Oak



B.L. No. 335 ¼-Cut Oak

*We Specialize on Work from Architect's Plans and Details*

385-387 Pacific Ave. **BATTS LIMITED** West Toronto

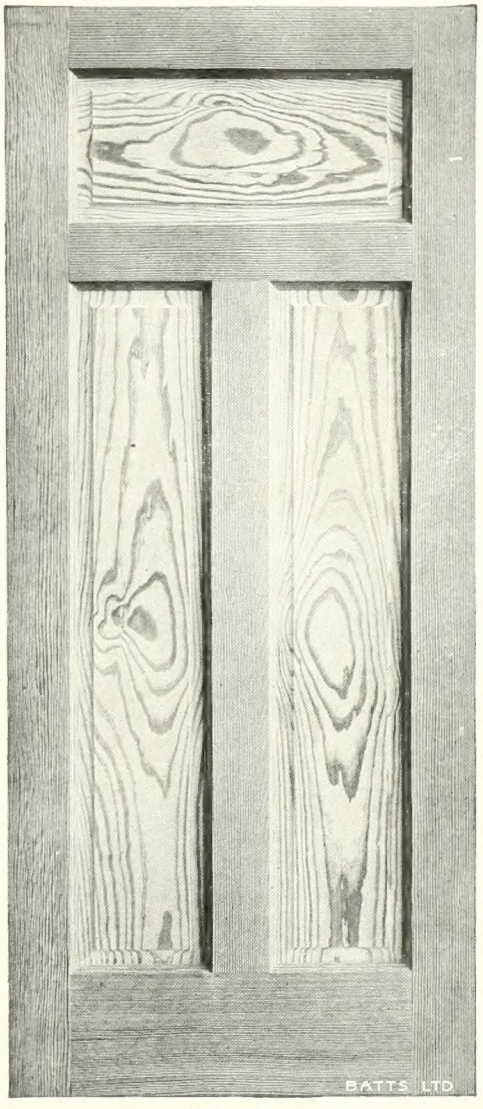
WEST
BATTS LIMITED
TORONTO

# BATTS' FIR DOORS

## BUY GOODS "MADE IN CANADA"

(WE MANUFACTURE ALL OUR OWN GOODS)

CLEAR EDGE GRAIN
FIR STILES & RAILS
GEORGIA PINE
RAISED PANELS




WE MAKE FIR DOORS
TO ANY DESIGN
WRITE FOR PRICES

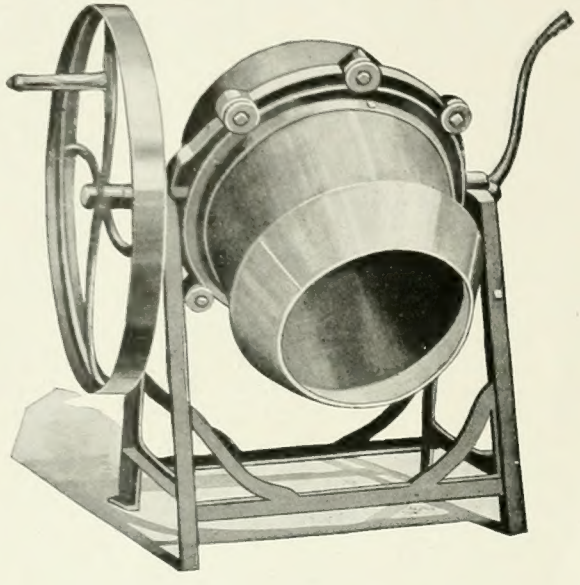
B. L. 350
Clear Edge Grain Fir Stiles, Rails and Georgia Pine Panels, 1⅜" thickness, $2.10 each.

OUR FACILITIES FOR THE EXECUTION OF ORDERS FOR DOORS AND COLUMNS TO SPECIAL DESIGN ARE SUCH THAT WE CAN SATISFACTORILY MEET ANY REQUIREMENT.

385-387 Pacific Ave. **BATTS LIMITED** West Toronto

# LEADER NO. 2 Concrete Mixer

## Hand or Belt Driven, Suitable for Large or Small Jobs



THIS inexpensive mixer has the same general qualifications as our larger machines. The drum has the mechanical equipment that has made our "No. 3" such a favorite. Practically the same results can be accomplished with this smaller machine, but with a greater effort, of course. It is a rare bargain, however, at the price.

It is practical for general use on large or small jobs, with or without power. It saves time, labor, and is many times better for mixing than hand labor. It is entirely practical to have several on the job.

The "Little Boss" is efficient for mixing all kinds of concrete, wet or dry.

### The Very Heavy Fly Wheel

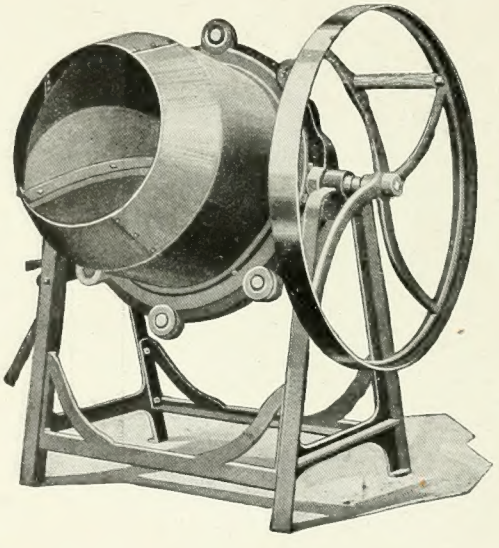
Or balance wheel, is so perfectly designed, that the average laborer is able to turn the loaded drum with one hand. This fly wheel or pulley is 40 inches in diameter and has a 3 inch face, making possible a direct drive from gasoline engine of 1½ horsepower or more.

### Drum Bottom

Is cast iron retained in a heavy yoke and ring by 3 inch diameter rollers, which is much stronger than the usual pivotal mounting. The sheet steel drum can be loaded and dumped without stopping, hence a clutch or loose pulley is unnecessary. The locking device can be adjusted as desired, determined by the weight of the material and consistency of the mixture. Dumping is made very easy by the large lever.

### Driving Gear

Of the drum is by pinion on large shaft engaging the toothed track or bull gear on the drum. The track is a separate casting, permitting an inexpensive repair when necessary through long wear.



### SPECIFICATIONS

| | |
|---|---|
| Diameter of Drum, 26 inches | Daily output of Mixer, 35 to 60 cu. yds |
| Depth of Drum 33 inches. | Height to bearing of Drum 36 inches. |
| Capacity of Drum, 3½ to 5 cu. ft. | Diameter of Belt Wheel, 3 inches. |
| Output of Mixer, a batch every two minutes. | Shipping Weight 600 pounds. |

Shipped F.O.B. Exeter, at a very low price. *Write for Special Price*

# The Exeter Manufacturing Co., Limited

**Exeter** **Ontario**

# The Canadian Builder and Carpenter

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PRESIDENT AND GENERAL MANAGER

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Published 1st Week in each Month by

The Commercial Press, Limited, 32 Colborne Street, Toronto, Canada

*Montreal Office:* 704 Unity Building

Subscription Rate, $1.00 per year in Canada and Great Britain; $1.50 to the United States; $2.00 to Foreign Countries.
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Advertising rates on application.

VOL. 5 TORONTO, JULY, 1915 No. 7


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# The Elliot

***The one Woodworker which any Carpenter or Woodworker can operate.***

It will cross cut, rip, mitre, bore, groove, dado, rabbet, moulding and dental mould, and do every kind of work usually done on a factory machine.

You can [illegible] stair strings, 16 feet long, 12 inches in 10 minutes and cut and shape [illegible] ends one way across.

It cuts at any angle and cross cuts as a swing saw.

Joists and other long stuff can be cut without shoving the plank over the saw.

It is a portable machine, easily moved from room to room.

Two hundred and fifty in use in one city alone.

Electric power to run it costs $1.50 to $2.50 per month.

Write us for descriptive literature and we'll show you how your production cost can be reduced with the minimum investment.

**Be a Builder Agent**—We are making a special proposition to responsible builders willing to take orders for Elliot Woodworkers. Big demand and liberal profits assured; ask for details.

Patented 1909—1914

## The Elliot Woodworker, Limited

**480 Bathurst Street., Toronto, Ont.**
**2405 Woodward Ave., Detroit, Mich.**



# ASPHALT SHINGLES
# SURFACED ROOFING IN ROLLS

Red—Green—Ruby—Gravel—Grit

*Beautiful, Harmonious*
*Adds to the House*

CANADIAN ROOFING
FOR CANADA

*Economical, Lasting*
*Easy to Lay*

*Made in Canada by*

## Canadian Roofing Manufacturing Co., Ltd.

**Windsor** ***At your Dealers or Write us for Samples or Prices*** **Ontario**

Also manufacturers of Asphalt Building and Insulating Papers in all grades

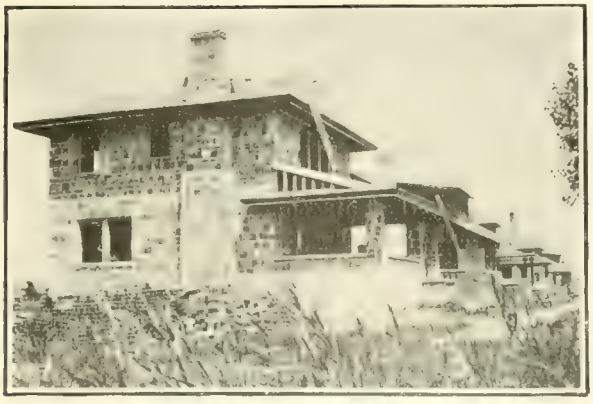


Fig. 1. Two-storey house with tapered chimney. Building is ready for stucco.

Fig. 2. How house looked after the application of stucco.

# The Use of Hollow Clay Tile in Building Construction

*Since there is an increasing use of hollow ware in building construction in Canada, readers of The Canadian Builder and Carpenter will no doubt peruse with interest the following article dealing with tile. Plans and descriptions are also given of two tile houses.*

By EDWIN G. ZORN

HOLLOW tile, while comparatively an innovation in residence construction in the majority of the cities and towns in United States and Canada, is by no means a new material. It has a long and interesting history behind it across the seas in European countries, where time has proven its worth. From there it has been transplanted to America, where it is fast growing in popular favor as a building material which makes for safety, comfort and economy in home building.

The accompanying illustrations are of a group of residences constructed of hollow tile in Chicago. They are five in number and were built by a large real estate company with a view of selling them again to home-seekers.

We hear so much criticism of real estate men and contractors who make a practice of speculative home building. It is charged that good principles of construction are violated to secure economy in erection. Here is a case where houses "built to sell" were also "built to stand," and at a figure that is considered very reasonable in Chicago for a building of the size and proportions which characterize the houses here shown.

Four of the houses are of two storeys and one is of the bungalow type. Those having two floors contain six rooms in all, the living rooms being on the first floor and the sleeping rooms on the second. All rooms on the first floor with the exception of the kitchen are finished off in oak, while the kitchen has a birch trim. The bedrooms are also finished in birch. The houses are modern in every respect, being electric lighted throughout and heated with a hot-air furnace. They were designed by Lewis and Dougherty, a Chicago firm of architects, the work of erection being done by local contractors, at a cost of $4,250 each for the two-storey buildings.

The walls are eight inches thick and are constructed of hollow building tile. The tile makes a wall which is very strong, practically fireproof, thoroughly dry at all times, and a perfect insulation against extreme temperatures, whether it be the chilling blasts of winter or the withering heat of summer.

### Why There is Merit in This Type of Construction

The wall is strong because it is composed of a tile made from clay burned hard in a kiln where a temperature of about 2,000 degrees is reached. When properly laid up, tile so burned are capable of carrying a load of over fifteen hundred pounds to the square inch of

Fig. 4.—Another house ready for stucco.

bearing members, a strength which is able to support six storeys of ordinary construction.

A wall which is constructed of hollow tile is about as fireproof as any material can be. The very nature of the material from which it is made—clay—means that it cannot burn. Also, and this is important, where hollow tile is used, the plaster is usually applied directly to the surface of the tile, which is grooved to receive it and hold it fast. The fact that a wall constructed of hollow tile is not damp overcomes any objection to

applying the plaster directly to the tile wall. In this construction there is, therefore, no air space between the wall and the plaster to form a flue to fan the flames of a fire.

The reason hollow tile keeps the interior walls of the house in a dry condition is because of the insulating air spaces in the tile. In most masonry walls, dampness is a source of unending trouble. The common theory advanced for such dampness is that the moisture seeps up from the foundation through the walls, where it finally penetrates the plaster and produces a damp or moist condition. If the walls are built of a hard burned tile, with an absorption under ten per cent., there is no chance for such a creeping of the ground moisture. The more common source of damp walls is caused by the deposition of moisture on the inside walls of the heat or cold of the outside wall. The fact that the inside wall is of the same temperature as the air on the interior of the house prevents condensation or "sweating" from taking place, and so keeps the wall of the rooms dry.

This same principle of insulating air spaces in the tile gives rise to the claim for this material that it makes a house which is warm in winter and cool in summer. It is a known fact that air conducts heat much more slowly than a solid material. This same principle is used in the construction of refrigerators and ice chests. In the cold months of the year when it is desired to retain the heat on the inside of the house, the tile wall, by its insulating properties, prevents that heat from escaping through it and thus being lost. In summer, the operation is reversed, the tile keeping the heat of

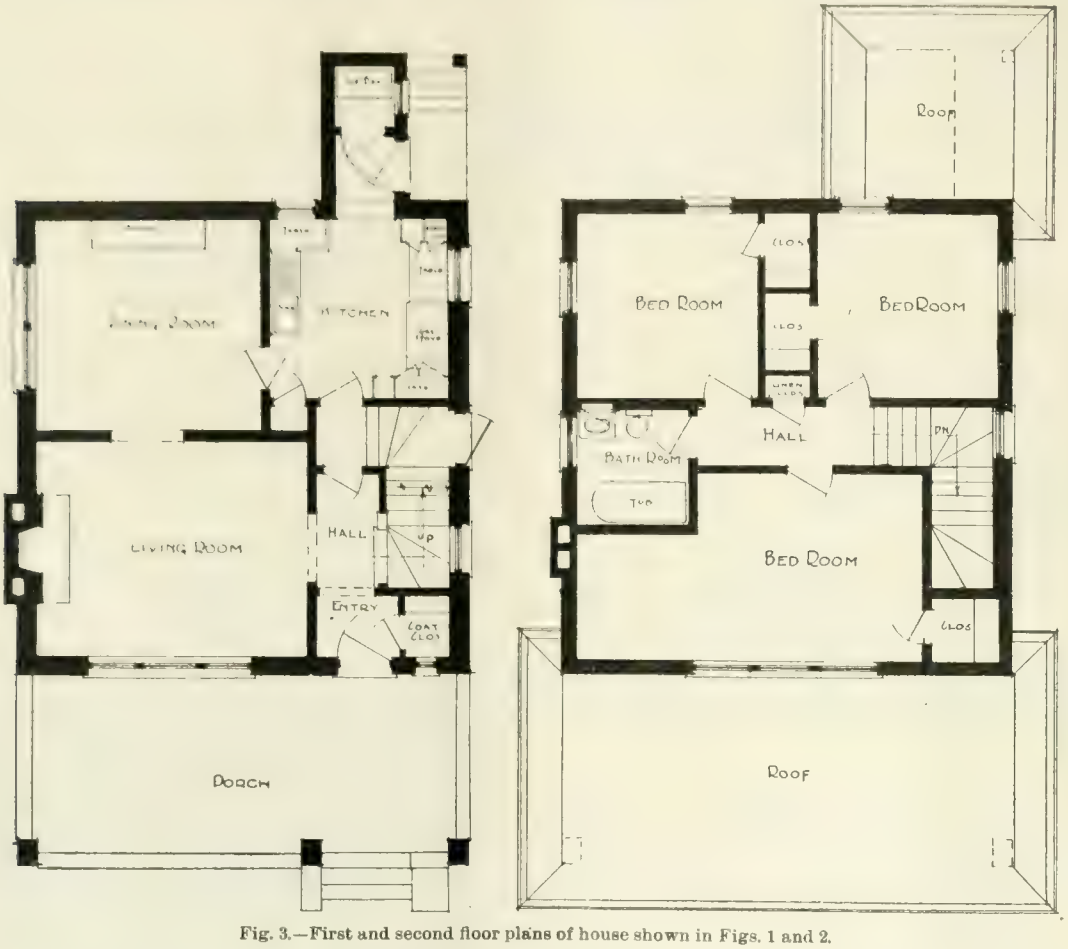



Fig. 3.—First and second floor plans of house shown in Figs. 1 and 2.

house by condensation, or what is generally called "sweating." The temperature of a wall of solid masonry changes with every variation in outside temperatures. It is true that this change takes place slowly, but when the whole wall changes from, for instance, hot to cold, it takes some time before that wall can be heated up again. In the meantime on the inside of the house warm air, which usually contains a large percentage of moisture, on striking the cold surface of the wall deposits what might be called a dew in very minute quantities. This condensed moisture is what makes the average masonry wall damp and very often ruins expensive decorations. In a hollow tile wall the inside wall of the tile is insulated from the outside wall by intervening air spaces. The inside wall always assumes the same temperature as the air on the inside of the house, regardless of what may be the degree of the outside air from penetrating through the walls to the interior of the house, while it retains the cool air which has entered during the night, on the inside of the house, where it may be of the greatest benefit and comfort. The only connection between the inside and outside walls of the tile is by narrow webs, which conduct but a very small particle of heat or practically none at all.

### Hollow Tile Has Advantages for the Contractor

These are but a few of the many advantages of hollow tile as a building material. While the foregoing features are of more interest, perhaps, to the one who is going to live in the house, than to the contractor, they are, nevertheless, advantages which aid in the sale of the building when erected.

The contractor may be interested in the low cost of

laying and handling tile, because of the size of the unit; it is large and permits of rapid handling and laying. The average contractor, who possibly has not made himself sufficiently familiar with hollow tile construction, figures the cost of laying hollow tile at too high a figure. It is a fact, however, which has been gleaned from observation on several jobs, that the average mason can lay a quantity of tile in a day equal to four thousand brick, and in some cases, six thousand.

The many features of merit in hollow tile, which have been outlined above, are creating a constantly growing demand for homes built of hollow tile, and builders should familiarize themselves with this type of construction.

## Styles of Fireplaces

It goes without saying that the fireplace adds a charm to a home which makes it more cheerful and attractive. The number of fireplaces being installed is growing, and many new styles, with and without mantels, in beautiful designs, have been used with artistic effect, says a writer in the Brick and Clay Record. This is not only true of city homes, but builders of town, village and country homes, as well as hotels and churches, and other public buildings, are making use of decorative fireplaces. The use of brick or cement block in fireplace construction permits the erection of a design which fits in with the general scheme of the room.

Any design may be modified to secure a maximum of decorative effect. For instance, a simple fireplace of plain construction would be a suitable one for an office; a large one, in keeping with the size of a rotunda, for a hotel; an inglenook, for a den and a variety of sitting rooms, dining rooms and parlors with pillar effects, square mantel or arch construction built of plain or special faced moulded units—block or brick. Fireplaces built of cement or brick are not of any particular size, but may be arranged to suit the room for which they are intended. The elasticity of these forms of construction allows any size to be easily secured. An experienced workman can easily erect the fireplace. The addition of elaborate decorations does not add very much to the work of construction when brick is the material used. The workman must, of course, have a good knowledge of joints, since sometimes a narrow joint is desirable, and at other times a very heavy joint. The top of a fireplace may be varied to suit the ideas of the builder or the house owner. For instance, decorative top of cement blocks or bricks may be used, or a wooden shelf, to harmonize with the rest of the fireplace construction. For a den, a bookcase constructed

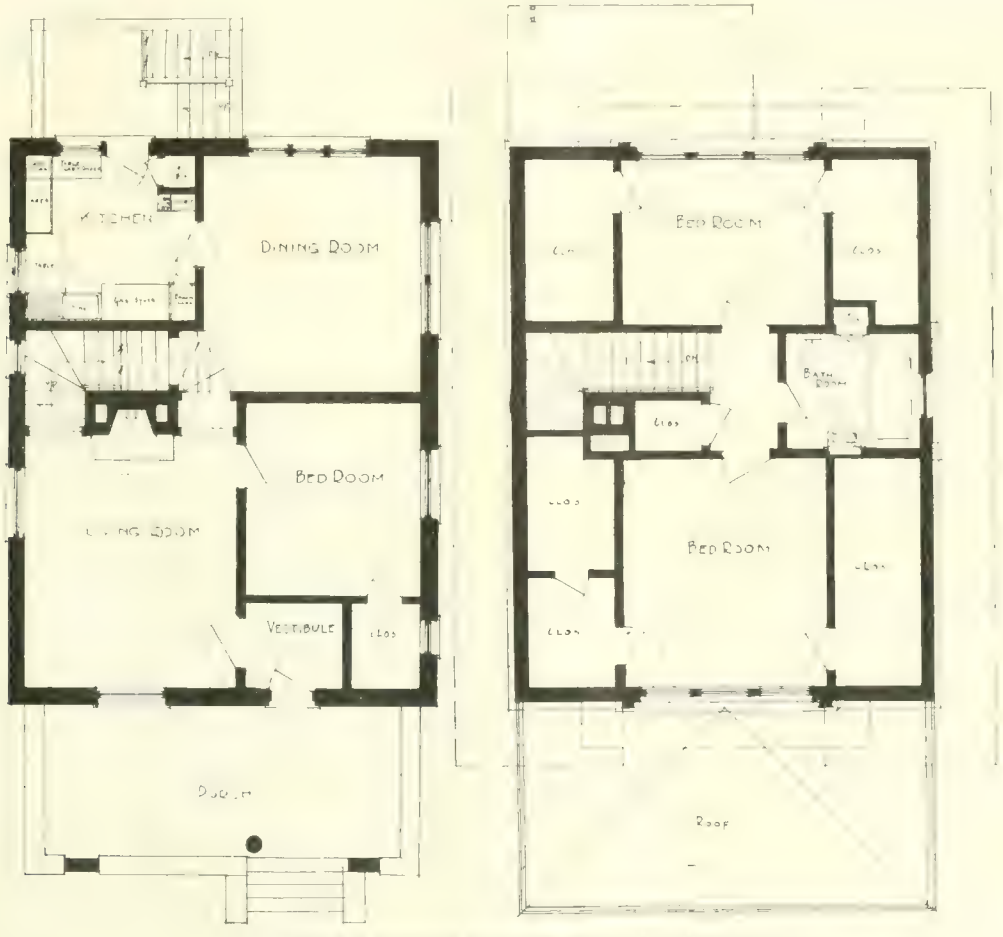



Fig. 5.—Plans of one of the tile houses referred to in the article.

either at the side of or over the fireplace, or both, is often desirable and good.

One of the chief objects for the builder to bear in mind in any of these arrangements is symmetry, for with a simple, appropriate, and symmetrical design in keeping with the surroundings, the fireplace becomes a harmonious, attractive and useful piece of house furnishing.

The ambitious man should keep in mind the fact that he must do things, as well as wish for them, if he would prosper in his ambition.

# Building Methods Used in Construction of Provincial Sanitarium at Whitby : : : : :

STAFF ARTICLE

*This article shows the organization of the construction force, and a number of details of the buildings. Other articles will deal with economical methods in the erection of cement and brick walls, etc.*

ARTICLE II.

THE construction methods used in the erection of the new Provincial Sanitarium at Whitby are numerous and varied. As the accompanying organization chart, Fig. 3, shows, the staff is directly responsible to Mr. S. A. Armstrong, Assistant Provincial (Ontario) Secretary. As he is a consistent student of Gilbreth, it was quite natural that several of Gilbreth's schemes were adopted in the construction of these buildings. A number of these schemes will be referred to and explained in this series of articles.

Referring to Fig. 3, it will be seen that each man is held responsible for a particular portion of the work. For instance, Mr. Rowe is superintendent of construction, and has charge of all the actual construction work. Similarly, the work is divided for Mr. French and Mr. Hogg, and each knows for what he is responsible.

The sign shown in Fig. 4 appears in conspicuous places where work is being carried on, and has been a means of preventing accidents and poor work. The warning sign, Fig. 5, is posted at the side of elevators used to elevate materials on construction work.

## Hollow Ware Laid Horizontally

Hollow ware is used for foundation work and is laid horizontally, as shown in Fig. 6. This method of laying prevents any "flue" effect of the air. The hollow ware is made at the Government Brick and Tile Plant, at Mimico, in five sizes, 2x12, 4x12, 6x12, 8x12, and 12x12. In addition all the stock and rough texture brick, plinth corners, roofing tile, flooring tile, sanitary cove, cove angles, and cove corners are made at their own plant.

Fig. 6 illustrates both the laying of the hollow ware

**Provincial Secretary's Department**

**ONTARIO**

**NOTICE**

Rule 6A. The use of Intoxicants by employes while on duty is prohibited. Their use, or the frequenting of places where they are sold, is sufficient cause for dismissal.

By Order,

**S. A. ARMSTRONG,**

Assistant Provincial Secretary.

Fig. 4. Sign printed on cardboard and posted in conspicuous places where construction work is being carried on.

**WARNING**

**These Elevators are Dangerous.**

**Riding on Them Forbidden.**

**Anyone Riding on Them Does so at His Own Risk.**

Fig. 5.—Warning sign printed in red on linen.

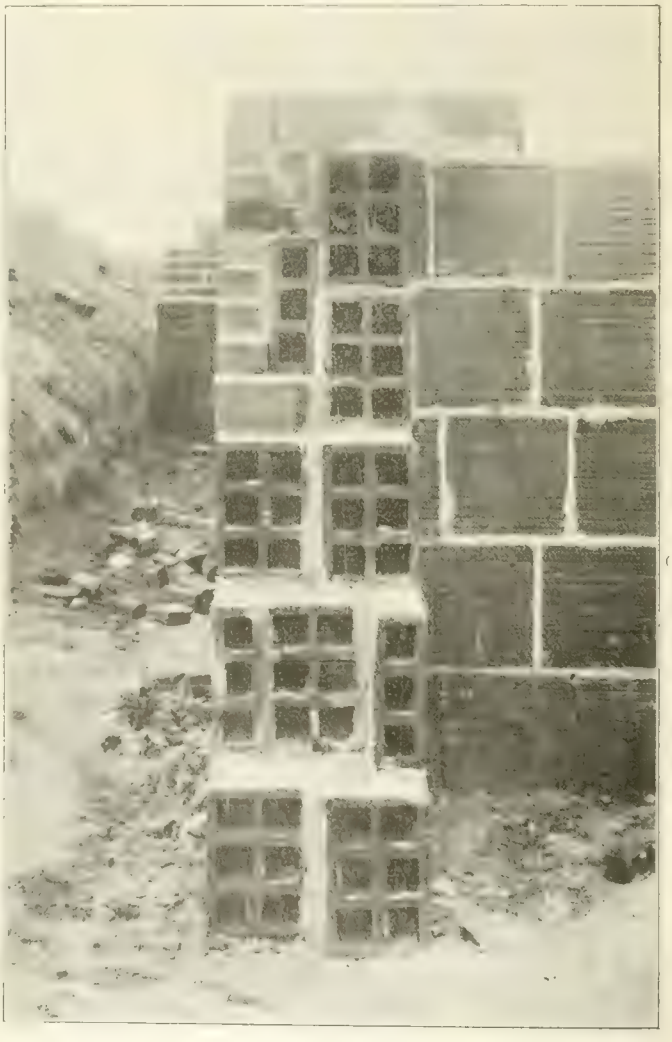


Fig. 6.—Hollow ware made at the Provincial Brick and Tile Plant, showing it used at Whitby Sanitarium for foundation and the beginning of the brick wall.

foundation and also the facing of the first floor wall with brick. Fig. 7 shows the front of the dining room, and is a beautiful piece of work which can hardly be judged from the illustration. The paneling and friezes are well planned and carried out. This view shows the use of plinth corners, which cannot be distinguished from brick.

### Reinforced Concrete Beams

Reinforced concrete beams are used for the balcony floor, as may be seen by referring to Fig. 1 in the June issue. Fig. 8 shows a number of these which are made on the premises. An efficient plant was constructed for making these beams. Collapsible cores and overhead carrier track are features which contribute to their economical manufacture.

These reinforced concrete beams are made up to 20 ft. 6 in. in length. Being hollow, they combine lightness with strength. They permit quick and cheap construction of a floor as well as allowing considerable flexibility.

## Removing Stains from Stonework

In the first place, it cannot be insisted upon too strongly that no stone now accepted as a standard in the market contains within itself the elements of staining or discoloration. It may change its color somewhat in weathering, but this will be in the way of a mellowing of tone, and will give no unsightly blotches. This is proved by the natural exposure of the rock in the quarry. Where there is staining in the walls of a building, it can safely be set down to faults in the setting, or to some cause extraneous to the stone itself.

The most prolific source of trouble is, of course, the cement that is used in setting the stone. Ordinary

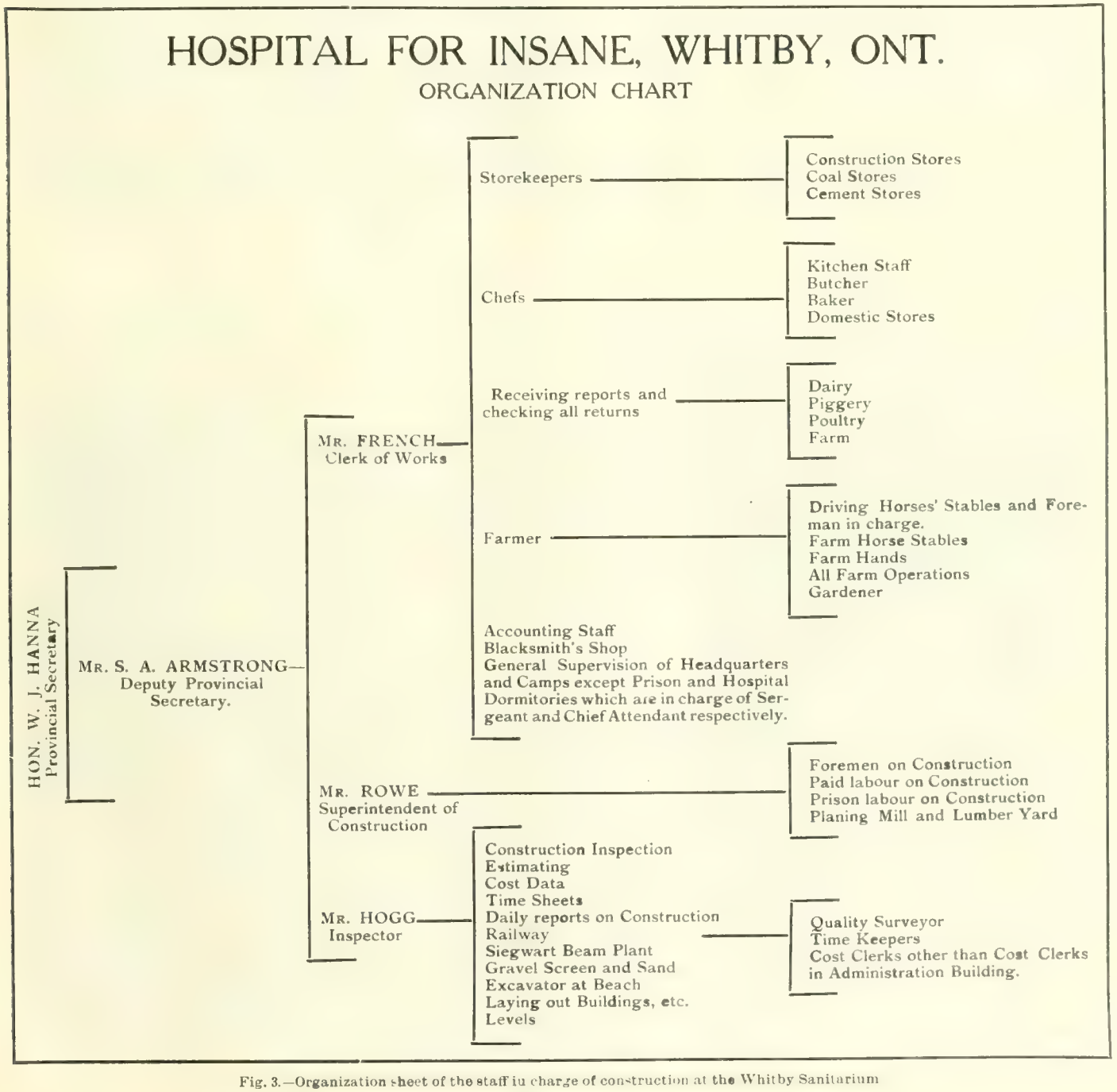



Fig. 3.—Organization sheet of the staff in charge of construction at the Whitby Sanitarium

Portland cement will badly stain almost any stone. Various so-called "non-staining cements" are widely heralded, but it is the universal experience of stone-men that little dependence can be placed on these.

In the old days before cement was so widely used, builders rarely had to complain of staining. There are thousands of buildings that have stood for half a century or more that show only the kindly mellowing of time, save for the effect of smoke and dust incidental to city life.

### How Trouble May be Avoided

Architects will specify very particularly that stone [illegible] cement mortar and think that they guard against all trouble if they require the back and sides of the stone to be coated with waterproof paint. Undoubtedly a good paint is much protection, but the difficulty is to coat the beds and joints of each stone clear to the face. A narrow strip left unpainted will permit the carrying of the discoloring moisture from the cement to the face of the stone by capillarity.

All of this trouble could be avoided if the architects would only insist that the stone be set entirely in lime mortar, made in the following proportions: One part lime and three parts sand. The lime to be thoroughly slaked and the sand well tempered; all mortar to lie in the pile at least twenty-four hours before using; all sand to be clean, coarse, and free from loam. If the most delicate stone is set in mortar as above, and the back of the stone plastered with the same mortar, it positively will not stain.

There is another way in which stone may be stained —by the drippings from concrete floors or roofs. In such cases the discoloring moisture runs down the face of the stone, and no painting of the back or beds can afford any protection. The utmost care in superintending the construction is the only safeguard from this disfigurement.

Cement stains cannot be eradicated by any wash or other treatment. Fortunately, they are apt to bleach out in time under the influence of the sun and the weather. The architect and the owner alike are naturally greatly exercised when cement stains appear, and try to seek some immediate remedy. The only thing in it is to have patience and wait for the natural bleaching, which may take weeks or even months.

### Do Not Wash the Stone with Acid

The stone setter, anxious to leave a building in spick and span condition, may suggest that it be washed down with muriatic acid. This should never be permitted. The acid may take out some of the stains for the moment, but it burns the surface and eventually will discolor even those portions that escaped the original staining.

There was a time when scrubbing with wire brushes was permitted, but this has generally been discarded, since its bad effects have been recognized. It is impossible to use wire brushes without leaving a coating of iron on the surface of the stone, and that is bound to leave a worse stain than it corrects.

The sand blast is sometimes employed, but generally

Fig. 7. Beautiful piece of paneling and frieze work on the front of the dining room at the Whitby Sanitarium. When the photograph was taken the roofing tile had not been laid. The brick and roofing tile were made at the Provincial Brick and Tile Plant at Mimico.

for old buildings that have become discolored from smoke and soot. This method should always be discouraged. The sand strikes the stone with a tremendous impact. It destroys the "skin" which forms on the surface of the stone by deposition of mineral ingredients on the evaporation of the interstitial water. It also stuns the grains or crystals of the stone and tends to hasten the weathering.

The very best treatment of stone to remove smoke,

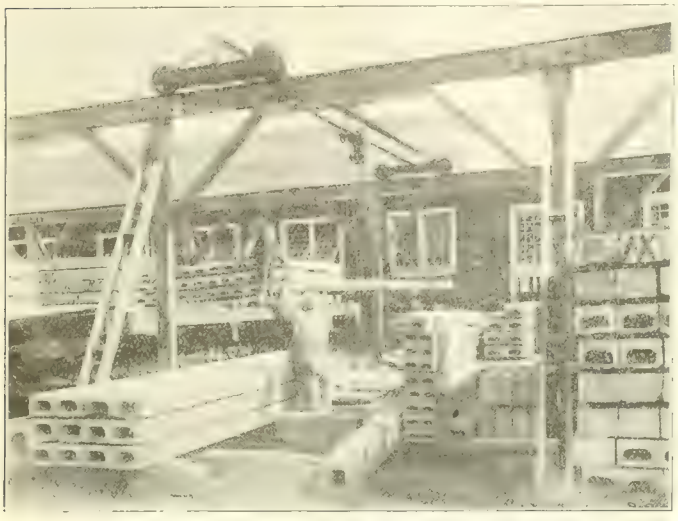


Fig. 8.—Reinforced concrete beams used for balcony floors.

soot, dirt, mortar, etc., is a simple washing. A recipe that is recommended by stonemen of the widest experience is as follows: Prepare a wash of soft water and about one and a half bars of common laundry soap. Boil until the soap has been thoroughly dissolved. Add a fine, clean, gritty sand (white preferred) and mix to about the consistency of putty. While mixing add about five tablespoonfuls of ammonia per bucket of water. With this preparation scrub the surface with a stiff scrubbing brush. Wash down with a stream of water from a hose, and then go over it again with scrubbing brush.

### Stains from Metal Work

While any building may need a cleaning, a great deal of the staining could be avoided if more care were taken. While speaking of the evil effects from cement and the dripping of dirty water, there are other things to be guarded against. The rust from improperly protected iron or steel and the verdigris from copper or bronze sheathing have disfigured many a fine structure. The writer knows of one very costly building where the oil-saturated exhaust steam from hoisting engines was discharged directly against the facade. What wonder if this is permanently stained? Doubtless the architect is speculating as to the cause of the discoloration, and is inclined to blame the stone.—Stone.

## Thin Versus Thick Coats of Paint

**There is this vast difference between a coat of oil paint and a coat of water paint—while the former should be as thin as possible to get it within reasonable limits, and while preserving the body, the latter is best if put on quite thick. Some painters have an idea that a thick coat of oil paint will preserve work better than a thin one. As a matter of fact, three or four coats of** paint, all very thin, give the best possible results. Zinc oxide, which is sometimes condemned for want of body, is used too thick to be durable on some occasions, while it would be very much better to go to the small extra expense of an additional coat and get perfect results both in appearance and durability. An expert puts the case of thin coats very nicely when he says: "There seems to be considerable misapprehension regarding the covering capacity claims that can be made for good metal paints, due to the fact that certain painters, from a theoretical standpoint, have considered a thick coat essential to good painting. The contrary is the truth as borne out in practice, as we wish decidedly to take issue with any man who advocates and uses a thick coat of any kind of paint. The more you can brush out a coat of paint and have it properly cover the surface, the better will be the results of drying, and the more fit will that coat be to receive and hold succeeding coats. A thick paint film is bound to cause trouble to itself and to succeeding coats; they will not become thoroughly knit together, they will not form a homogeneous coating, and with the contraction and expansion of the metal are bound to crack badly. This is true whether the thick coat results from the 'flowing on' of a paint capable of better spreading, or from a paint of poor capacity that can only cover by using a heavy coat. Further than this, if your paint has the proper capacity and can be thoroughly brushed out for the first coat and brushed into the surface, it will get a firmer hold on it, fill its pores better, and make a more satisfactory protection to the metal as well as a

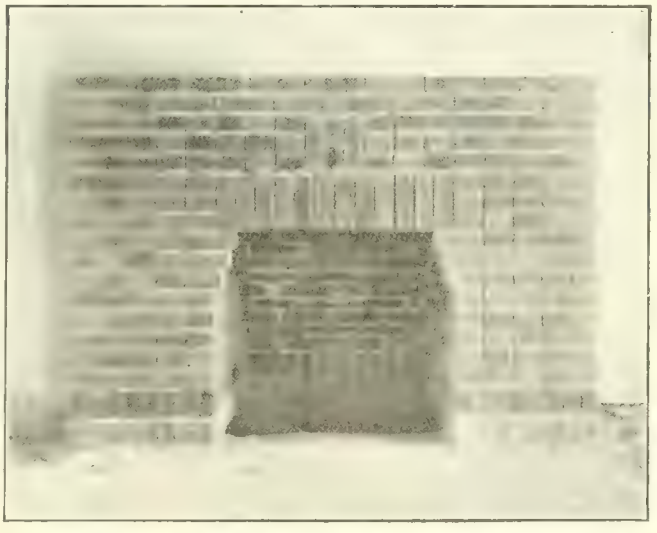


Fig. 9.—Fireplace in one of the Whitby Sanitarium cottages built of rough texture brick from the Provincial Brick and Tile Plant.

better foundation for the coats to follow. Many paints are of such a character that they can cover up the surface only when the paint is piled on thick, and you can take it from us that where you find this true (it will show up in the number of square feet you can cover per gallon) you would best pass the paint by. Of course, large spreading capacity with poor covering power is of no value; but where you get the large spreading plus good covering, you are getting the most for your money."

All metal which has been bent or otherwise injured in handling or in transit should be carefully repaired before being used. Reinforcing bars must be straight and free from flaws in any degree calculated to impair their strength.

# Some Ideas on the Construction of E. A. Hall's Garage

*When building a new garage, or making alterations on an old one, information about what is being done in this line should be of value. This article describes the construction of a Toronto garage, embodying many interesting features.*

By EDWARD ARMER

THE planning of a garage calls for attention to many details not encountered in the construction of stores, houses, etc. For instance, in planning the repair department, one must consider where the machinery, such as the lathes, drill presses, etc., are to go. Then, too, a pit is essential and care must be given to the layout of this.

### Well-Planned Toronto Garage

In Fig. 1 is shown the exterior view of E. A. Hall's garage, College Street, Toronto. The building is new; the design is good and every care has been taken in equipping it to ensure efficient work and to give the patron the best of service. The building is of solid brick construction, and has a frontage of 43 feet and a depth of 134 feet. Of this, 28 ft. is taken up by the repair shop at the back, and about 17 x 17 feet at the front by the office. The remainder is used for car storage in the usual manner. The garage is 12 ft. high from floor to roof, and is provided with a basement under the office, and apartments above the garage at the front. Access to the apartments is gained through a hall at the side of the office.

Fig. 1.—A well-equipped garage of attractive design, owned by E. A. Hall, College St., Toronto.

The garage is well lighted by the two large windows in the front, five windows at each side, six windows at the back, and four skylights. One of the windows at the front lights the office, but the other can be fixed up for a show window to display cars or accessories.

A toilet for patrons has been provided at one end of the office. A plentiful supply of hot water is always available from an automatic gas heater located in the apartments upstairs. Next the office is located the oil room, with a storage room above it. The storage room is reached through a small door from the landing on stairs leading up to apartments.

### Heating and Lighting

The building is heated from an 8-ft. Pease Economy boiler located in the basement under the office. The steam is carried through well-lagged mains along the wall and fed down through the radiators. The condensed steam is carried back to the boiler by means of large return pipes along the walls just above the floor. Under ordinary weather conditions it is not necessary to get up any pressure in the boiler, and in zero weather the pressure is never more than one pound. About one ton of slack coal, costing about $4 per ton, is burned per week. In the oil room are two trap doors, one leading to the coal bin for putting in coal and the other for bringing out ashes. In the ceiling above this trap door is placed a hook, to which a block and tackle may be fastened for pulling up the large cans of ashes.

The artificial illumination is from high-power tungsten lamps. Four 350-watt lamps in frosted globes are placed on the front of the building. Two 350-watt lamps, one in the office and one in the garage, illuminate the windows. Besides the window lamp a smaller lamp is placed in the office and nine 350-watt lamps in the main part of the garage. Four 350-watt lamps in the repair shop complete the lighting.

Oil is stored in the oil tank in the oil room shown in the plan of the garage, but both oil and gasoline are handled by means of a combination Bowser portable gasoline and cylinder oil tank. Having the cylinder oil in a small tank fastened to the gasoline tank not only makes it easy to handle, no carrying it around in a dripping can, but owing to the fact that the oil is right there with the gasoline when selling at the curb, it is often possible to sell oil and gasoline where only gasoline would otherwise have been sold.

In the corner of the repair shop is a toilet for the men, so that they do not have to use the one provided for the customers.. Around the walls at convenient points are installed seven extension sockets for connecting extension lamps or electric drill.

### The Repair Pit

The repair pit embodies some new features which should be of interest to garage owners and repair men. The illustration gives a sectional view of the pit showing its construction. The pit is 16 ft. long by 4 ft. wide, and is covered by planks placed crossways on the pit. By removing the planks at the ends and leaving them in the middle, two cars may be worked on at once by placing them crossways on the pit. The walls of the pit are of concrete and the floor is of brick set without mortar or cement on a bed of cinders. The soil here is very light and sandy and this arrangement is sufficient to carry water from the pit without a drain, although under other conditions a drain would be necessary. The pit is 4 ft. 6 in. deep, and at a depth of 22 in. from the top is provided with a ledge 7 in. wide, which serves as

a seat for the person working in the pit. Anyone who has experienced the strain of working in a pit and reaching above the head where the height is not sufficient to allow of standing upright, will appreciate the usefulness of this arrangement.

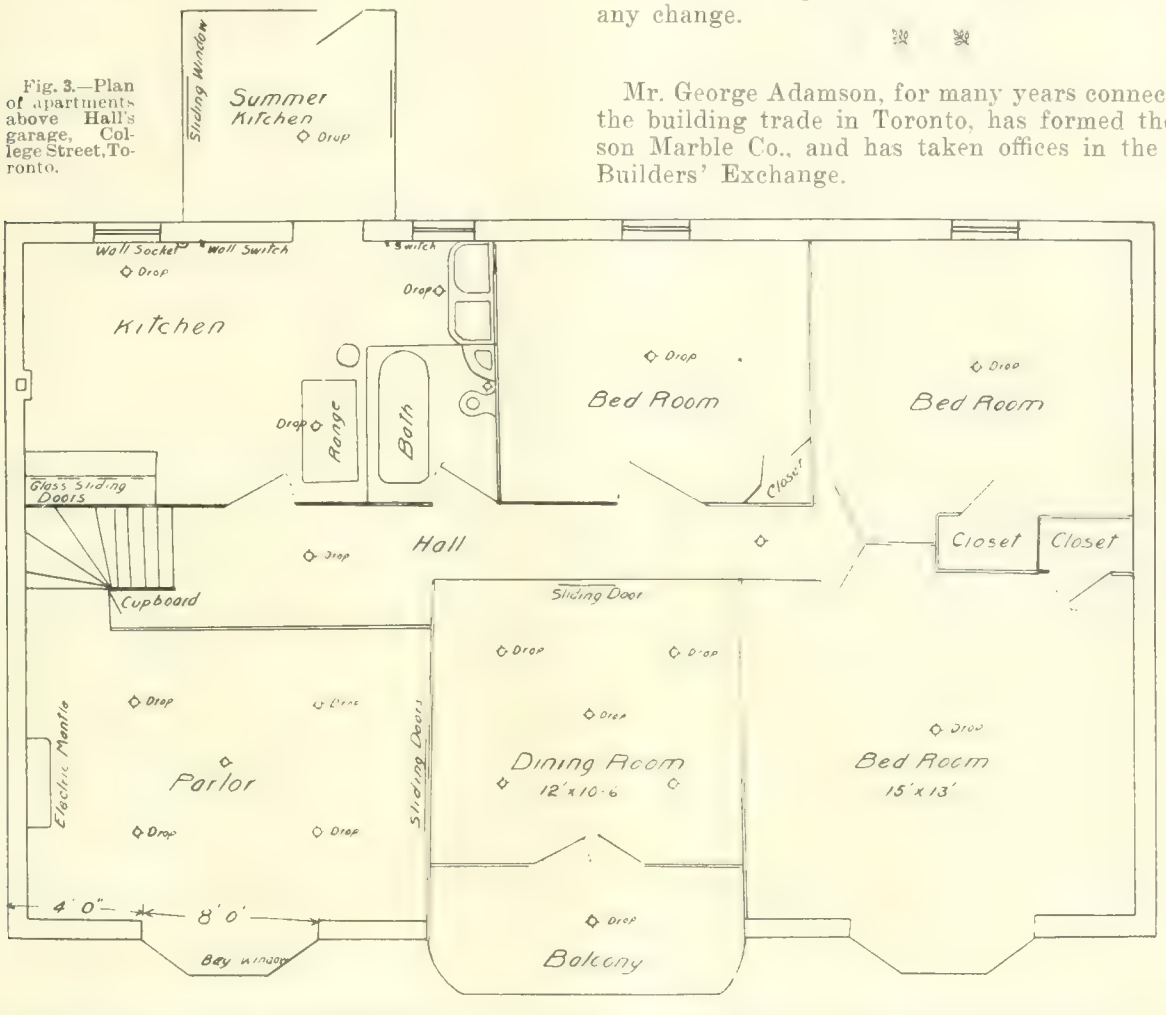
At one end of the pit a short plank is set into the wall, and on this plank is fastened a vise set on a swivel joint. This does away with the necessity of climbing out of the pit each time the vise has to be used. It is especially useful in fitting bearings which have to be placed in the vise and filed out a great number of times during the fitting.

Facilities for handling the engine are provided by a jib crane, shown in the plan of building. The crane consists of an arm supported at one end by the I-beam supporting the roof and swinging through a radius of 10 feet. A carriage running on this arm supports a set of chain blocks of 2-ton capacity.

## Montreal Exchange to Maintain Wage Scale

The Montreal Builders' Exchange has decided to maintain the schedule of wages adopted in December, 1914. The schedule terminated in May, but the members are of the opinion that conditions do not warrant any change.

Mr. George Adamson, for many years connected with the building trade in Toronto, has formed the Adamson Marble Co., and has taken offices in the Toronto Builders' Exchange.



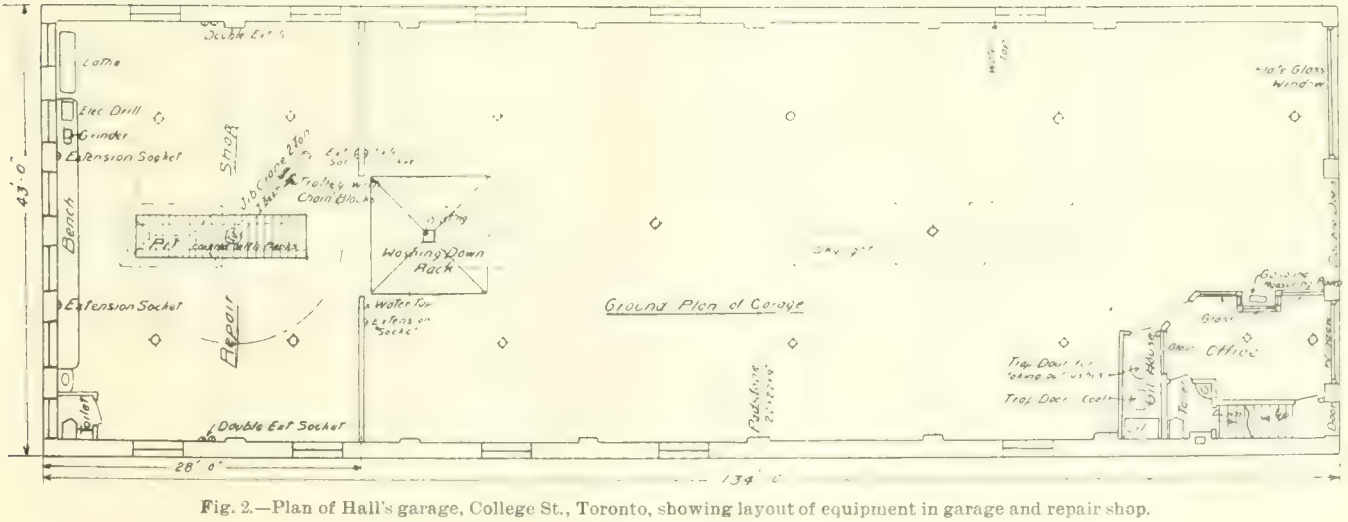




Fig. 2.—Plan of Hall's garage, College St., Toronto, showing layout of equipment in garage and repair shop.

Fig. 3.—Plan of apartments above Hall's garage, College Street, Toronto.

# Carpentry and Woodworking

## Costs of Three Types of Board Fences

The illustrations, Figs. 1 to 3, show three types of board fences built under the supervision of John H. Gardinier, of Lake Charles, La. Fairly close cost records were kept excepting for gates, the labor cost of which was included in the placing of boards. In the corral fence there were two 8-ft. gates and in the town fence two 12-ft. and two 8-ft. and one 4-ft. gates.

The holes for the posts were dug with a 6-in. post hole digger, the ground was moist, and would have been fairly easy digging if it had not been for the numerous small roots encountered for the first foot under the surface, as these fences were built in the pine woods. The posts for the corral fence were set by contract at 15 cts. apiece, costing the same as for the town fence by day labor. But the three men by contract made $3 a day. The only difference in price of having the posts set by contract and day labor was that the posts set by the day men were a little more carefully set. The cost of each fence is itemized.—Engineering & Contracting.

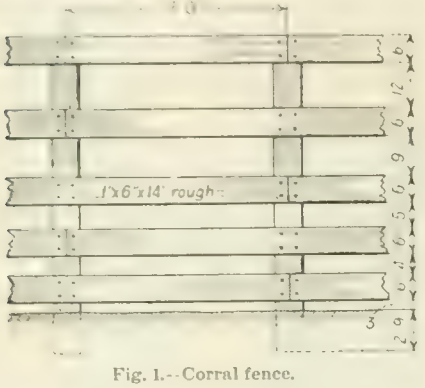



Fig. 1.—Corral fence.

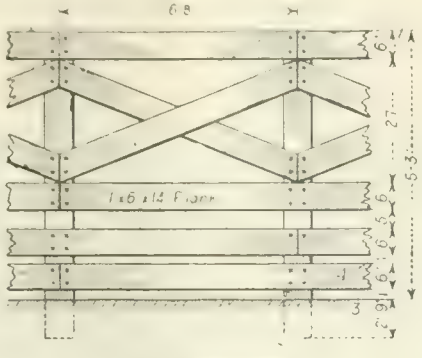



Fig. 2. Town fence.

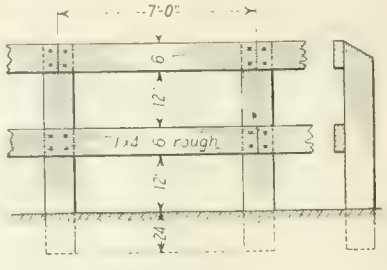



Fig. 3.—Park fence.

## Cost of Corral Fence (Fig. 1)

| | |
|---|---|
| 360 posts, 4 in. x 6 in. x 8 ft., 5,760 ft. B.M. at $14.75 | $ 84 96 |
| Lumber, 1 in. x 6 in. x 14 ft. plank, 6,300 ft. B.M. at $15.50 | 97 65 |
| 160 lbs. nails at $2.20 | 3 52 |
| Labor setting posts | 54 00 |
| Labor placing boards | 50 54 |
| Two per cent. use of tools on labor. | 2 09 |
| Distributing material | 8 50 |
| Total cost | $301 26 |
| Cost per lineal foot, labor | $0.04148 |
| Cost per lineal foot, material. | .07806 |
| Total cost per lineal foot | $0.11954 |

Posts set by contract at 15c. each.

Boards placed by day labor: One man, at $2.50; 2 men at $2.00 each.

## Cost of Town Fence (Fig. 2)

| | |
|---|---|
| 570 posts, 4 in. x 6 in. x 8 ft., 9,120 ft. B.M. at $14.75 | $134.52 |
| Lumber, 1 in. x 6 in. x 14 ft., 11,466 ft. B.M. at $15.50 | 177 72 |
| 248 lbs. nails at $2.20 | 5.46 |
| Labor setting posts | 85 50 |
| Labor placing boards | 119 81 |
| Distributing material | 31 50 |
| Use of tools | 4 11 |
| Total cost | $558 62 |

Posts set by day labor: One man, at $2.50; 2 men, at $1.75 each

Boards placed by day labor: One man, at $2.50; 2 men, at $2.00 each.

| | |
|---|---|
| Cost per lin. ft. for labor. | $0.05371 |
| Cost per lin. ft. for material | .09244 |
| Total cost per lin. ft. | $0.14615 |

Cost setting posts, 15c. each.

## Cost of Park Fence (Fig. 3)

| | |
|---|---|
| 173 posts, 4 in. x 4 in. x 5 ft., 1,153 ft. B.M. at $15.25 | $17 58 |
| Lumber, 1 in. x 4 in., 809 ft. B.M. at $15.00 | 12 13 |
| Nails, 30 lbs. | 66 |
| Labor setting posts and placing boards. | 40 00 |
| Distributing material | 2 50 |
| Use of tools on labor | 80 |
| Total cost | $73 67 |

Labor: One man, at $2.50; 2 men, at $1.75 each.

| | |
|---|---|
| Labor cost per lin. ft. | $0.03252 |
| Material cost per lin. ft. | .02737 |
| Total cost | $0.05989 |

## Easy Way of Removing Splinters

One of the most annoying minor accidents to which every woodworker is subject at times, is to have a sliver of wood stuck in his hand; and its removal is painful if not properly performed. If the splinter is softwood, it cannot be removed very easily with a needle or other sharp instrument.

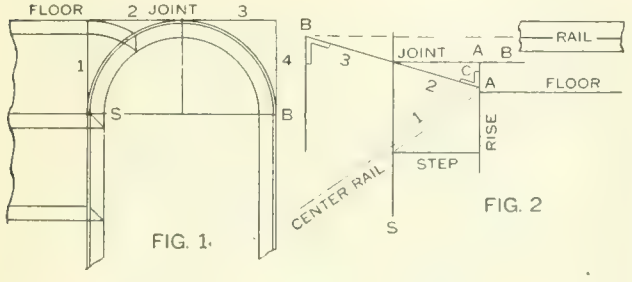
A very easy and effective way of removing a splinter without pain or inconvenience is to take a wide-mouthed bottle (such as a milk bottle), filled nearly full of water as hot as the glass will stand. Place the in-

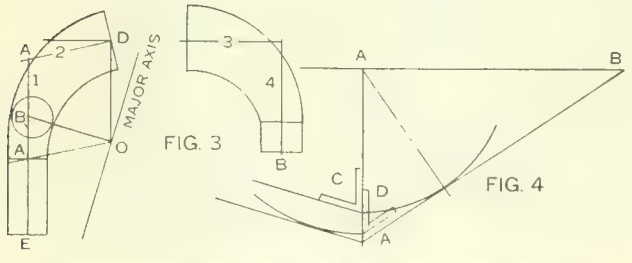
jured part over the mouth of the bottle, pressing down slightly, thus preventing any steam from escaping. This will cause the flesh to be drawn down, and in a minute or so the steam will extract the splinter, at the same time preventing the inflammation which usually follows an injury of this kind.

## Building Quarter-Turn Stairs

The sketch shows my method of laying out quarter-turn stairs. Referring to Fig. 1, which is ground plan, Nos. 1, 2, 3 and 4 are tangents around cylinder. The same numbers refer to same tangents in Figs. 2 and 3. Fig. 2 is elevation, showing length and pitch of tangents, No. 4 being level.

To get face mould lay steel square on board, Fig. 3; make A at tangent 2 same as A, Fig. 2, and tangent 2 same length at 2, Fig. 2. Make tangent 1 same length as 1 in Fig. 2. Add straight wood A to E. Make A B same as A B, Fig. 2. Draw B to O, or corner of




Sketch showing method of laying out quarter turn stairs.

diamond; square to B O is major axis. With steel square make 3 4, Fig. 3, making 3 same length as 3 in Fig. 2, and 4 same length as 4 in Fig. 1. Extend 4 to B for straight wood.

Bevel B, Fig. 2, belongs at B, tangent 4; bevel D belongs at D, tangent 2; bevel C belongs at C, tangent 1. Fig. 4 is intended to explain bevels at A.—W. B. S., in Wood-Worker.

## Bird House Construction

There are lots of odd jobs the carpenter can do, such as laying hardwood floors, making furniture, etc., but a recent issue of "Conservation," the bulletin published by the Commission of Conservation, Ottawa, Ont., brings out a new phase, whereby the carpenter may pick up a little work in his "off time." This is in the construction of bird houses.

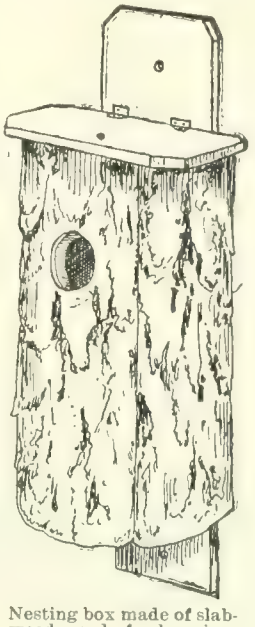
### The Value of Nesting Boxes

The article is reproduced herewith, intact, because the arguments used to show the value of birds to the general public may be used by the mechanic who is seeking odd jobs.

The bulletin says:

To a great extent the general public, and farmers in particular, have under their own control protection from the depredations of insects.

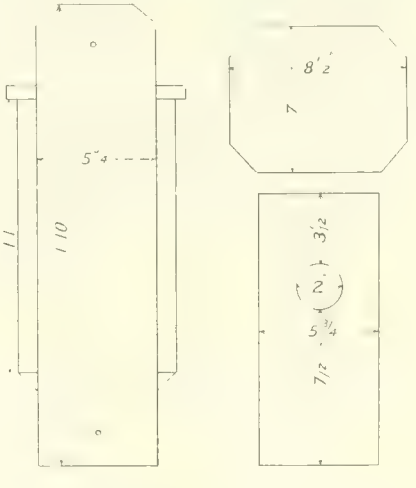
Beyond question, the greatest enemy of insect pests is bird life. Investigation has thoroughly proven that all Canadian birds, at some time, feed upon insects,



Nesting box made of slab-wood, ready for hanging.

some species to the extent of 95 per cent. of their diet, while even the common sparrow subsists largely upon insects.

There has been a gradual reduction in the number and variety of birds annually visiting Canada, and this is no doubt due partly to the lack of protection afforded




View of box from back. Lid and front of box.

them while with us. If some of our favorites are to continue with us, it is essential that steps be taken to improve the conditions under which they sojourn in Canada. By the cutting down of forests and clearing of wood lots we have removed the haunts of the birds, and thus have driven away those which formerly lived and reared their young in these localities.

To keep the birds with us it is necessary that some

### A Good Nesting Box

[illegible] and country residents have a duty to perform in protecting their protectors. Nesting boxes should be put in the trees. They are easy to make and the cost is very small. The illustrations herewith show the completed box and details of construction. Three pieces of slab wood, with bark on outside, are nailed together to form three sides of a long box; a round hole two inches in diameter being made as shown in diagram. The back of the box is a flat piece of wood. The top and bottom may also be made of slab wood. To keep the nest dry several holes are bored in the bottom, which is nailed on. The top is hinged to the back, and when in use is screwed down. This hinged cover allows the box to be cleaned of old nests. These nesting boxes may be attached to the trees by means of two pieces of wire passing through holes in the top and bottom of the back board respectively.

It has been clearly shown that, in proportion as facilities were provided for nesting, more birds availed themselves of the opportunities. Thus the bird-nesting boxes have been the means of increasing bird life, and especially the number of insectivorous birds, in the region where the boxes have been distributed.

Handsome solid brick residence at 210 High Park Avenue, Toronto. (Photo by courtesy of Batts, Limited, who supplied the woodwork and columns.)

## How to Tell a Good Workman

"How many tools do you own," is one of the first questions that a Milwaukee foreman asks a workman who applies for a job. If the man has a trade which demands hand tools, and he has but few of his own, it speaks poorly for his provident habits and consequently for his general ability. As a general thing the [illegible] has a well-filled kit and who says, "I'm going to [illegible] such a tool as soon as I can afford it," is a safe man to hire. The small kit man is liable to be careless and is almost certain to be a borrower. The tool kit, in fact, is a pretty good index to the man.

## "The Saw in History"

Henry Disston & Sons, Inc., Philadelphia, have recently put out a 64 page book entitled "The Saw in History." It handles in a comprehensive way the development of the saw from its prehistoric origin to its present highly-perfected form. Practically every type of saw is covered, descriptions of the more modern developments being especially complete. The text is supplemented with profuse illustrations.

The preparation of the book involved a vast amount of research work among libraries, private records, original manuscript, etc., and "The Saw in History" is claimed to be the first complete chronological record of the development of this tool.

The facts are presented in an interesting, readable manner and its perusal will prove valuable to anyone, especially to those in intimate touch with the present-day application of this universal tool.

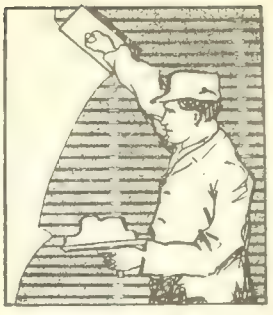
A copy may be had free of cost by application to Henry Disston & Sons, Inc., Philadelphia, Pa.

## Sarcasm

The doors of a certain new house had shrunk horribly, as is the way of the modern door made of unseasoned wood. The builder would not send the jointer to repair them, so the householder tried the ironical method and wrote.

"Dear Sir—The mice can run under most of our doors, but our cat cannot follow them. Will you please send a man at once to make room under the doors for the cat, and much oblige?"

# Brick Work and Plastering



## What Architects and Contractors have done to Perfect Cement-Plastered Houses

The use of cement plaster for exteriors of houses has given rise to what is almost a new style of architecture. Several years ago, when cement plaster first began to be used, houses were built along the same lines as formerly. No particular change was made in either plan, design, or construction, excepting that the outside surface of buildings was covered with cement plaster instead of clapboards or shingles.

Conditions have changed greatly since early days, however, so that now a sort of typical cement-plastered style has been evolved. Construction has undergone the chastening one would expect when increased experience points out errors, so that present-day methods are quite different from those of ten years ago. Many materials, at that time thought satisfactory, have proved failures. Other materials which were not considered in connection with cement-plastered houses are now utilized, and results give entire satisfaction.

There are many ways to build cement-plastered houses, most of them being developed by architects. Many of these methods are economical, attractive, and enduring, but in all fairness it must be said that some architects and contractors still cling to obsolete methods, seemingly not understanding the vitals of cement-plastered construction. This is proved by examining casual examples of bad plaster construction in evidence in almost any town. Those architects and contractors who have had widest experience have developed types of construction as ideal as any may be, but some of their less fortunate colleagues of limited experience still stick to antiquated methods, which do not prove satisfactory in the long run.

"Your well-built cement-covered house is one of the finest propositions in the world," said a well known architect, recently, "but an improperly built house, in which the plaster is not properly applied, or the underneath construction is not of the right sort, is bound to crumble in a short space of time. The secret of the plaster house," he went on, "is, first, to provide an imperishable base for the plaster; second, to put the right materials into the plaster, and then apply it so it will stick.

"Those architects who have failed in their plaster houses failed because one or both of these two things were neglected—either the material of the house, itself, shrunk or deteriorated, causing the plaster to crack, or the plaster was composed of inferior materials, or it was not properly applied."

So many satisfactory plaster houses have been built in all sections of the country, it is evident that hundreds of architects and contractors have successfully solved the problem of the right way to use plaster. Many hollow tile houses have been plastered on the exterior, and many are of frame construction covered with wood or metal lath. In many cases they are brick houses, plastered on the outside. As a matter of fact, all these types of construction are perfectly practical when cement plaster is used in the right way, but buildings must be constructed to take care of the conditions peculiar to each kind of material, or plaster is very likely to fall.

### Plaster on Frame House

The frame of a wooden house can be boarded on the outside and covered with wood laths, to which cement plaster properly applied will adhere in a perfectly satisfactory manner. Many architects and contractors have

Brick fireplace in Mr. Wood's house on Oakwood Ave., Toronto.

succeeded in doing this, and doubtless many more will achieve like success. Naturally, the frame of such a house must be thoroughly seasoned lumber or shrinkage of the wood fibres will crack the plaster later. Probably the best timber for such work is white pine. Next comes Western pine. Sometimes spruce can be bought which is well seasoned and sound. These are not cheap woods, however, they being so expensive that in many markets they cost as much, or more, than hollow tile or brick.

Hemlock is certainly a very poor wood for the framework of any house, much less a house which is to be covered with cement plaster. One can almost certainly predict failure of the plaster when hemlock is used.

### What Lath to Use

Wood laths should have the same qualities as the

wooden framework of the house. Pine laths are best. The next best material is spruce. Hemlock is very poor material for laths.

Getting the right kind of wood is not the only thing to consider in buying laths. They must be seasoned to just the right amount. "Over seasoned" laths are quite as impractical as "under seasoned" laths, because they are so dry they will soak all the water out of the plaster. Many architects have found that "half-seasoned" laths are best. They should be applied at least three-quarters of an inch apart. On the best work it is customary to wet laths thoroughly before the plaster is applied.

Of course, all these things cost money. Selecting timber for the framing of the house, with selected laths carefully nailed wide apart, greatly increases cost over and above that of ordinary construction. Then you must add the increased expense when laths are nailed wide apart for plaster wasted by "keys" breaking off and dropping down inside. The latter is one reason why unscrupulous plastering contractors are inclined to put laths too close together; so much material is wasted when laths are applied wide apart. The first cost should not be considered, however, for a frame house improperly built, or wood lath or plaster not correctly applied will certainly fail. Any man who wants a good cement-plastered house should go the limit and build it of the right stuff, regardless of cost, if he wants a permanent building, and architects and contractors should urge the best construction.

### Use of Metal Lath

Metal lathing can be used instead of wood laths, in which case the problem resolves itself into a question of what kind of metal lath to use. As most architects know, much plaster on metal lathing a few years old fails for the reason that metal rusts. After a few years it disintegrates and the plaster drops off. The best brands of metal lathing now come hot-galvanized or dipped in rust-proof paint. The difficulty with them is, however, that no matter how carefully metal is dipped or galvanized, new edges where metal is cut to fit on the job are unprotected. In addition to these are the bruises which a waterproof coating gets when workmen nail the lathing in place; every such place is attacked by rust later.

Probably the most satisfactory way to use metal lathing would be to buy the heaviest and most expensive brands, galvanized or dipped, and after the lathing is put in place coat over all exposed surfaces with rust-resisting paint. This would effectually protect any raw surfaces uncovered by cutting or bruising. Such a method would prove expensive as to first cost, of course, but it would insure a permanent job.

### Success in England

In England many houses are built of brick, plastered on the outside with cement plaster, and such methods have proved entirely satisfactory there. In America, unfortunately, much of the cement plaster on brick has failed by reason of the plaster dropping off. Strange to say, it is not the plaster which fails so much as it is the American brick which fail, for in most cases plaster itself does not disintegrate. What usually happens is this—dampness gets into the brick (which, no matter how hard they are burned, are not vitrified). Brickwork becomes saturated with moisture from the earth by capillary action, which, freezing in cold weather, bursts and causes plaster to slough off. If vitrified brick were used and a damp-proofing course was laid on the foundations before building the brick walls (to prevent moisture from crawling up the wall), probably there would be no difficulty in securing a permanent job. The latter has been found by many to be the right way to build a cement-plastered brick house, using vitrified brick for walls with damp-proofed foundations. On all brick walls the mortar joints should be very wide, raked out deep enough to provide a good mechanical bond for the plaster. All these precautions add greatly to the cost, but satisfactory plastering on brickwork can be obtained in no other way.—Chas. E. White, Jr., in "Building Progress."

## To Make a Good Roughcasting Job

Can any of your readers tell me how to make a good roughcasting job? I have tried two or three times, but have not met with any too great success.—E. P. Hawon.

Answer: For exterior walls on brick, metal or wood lath. See that the base coat is in good condition before beginning the roughcasting. Mix a batch large enough to cover the whole job; otherwise, I find that it is impossible to get the color uniform if mixed in small and separate batches. It does not make any difference how careful you are in mixing. Sand and lime are not expensive, so it pays to mix a large quantity at once and be on the safe side.

### Mixture for a Good Sized Residence

The following mixture will cover the exterior of a good sized residence: 4 yds clean, sharp sand or pea gravel; 1,000 lbs. grey or white lime. (For a dark color use grey.) One-quarter of a bag of good hair binds the mixture and will not show on the wall when finished. Slack the lime thoroughly and run it into a tight box; then mix the hair in well before putting in the sand. Keep mixing when putting the sand in, so that it will not settle in the bottom of the box. When well sanded, let it stand from twelve to fifteen hours, then run it through an ordinary sand screen into the box. This will give color and will leave the gravel a uniform size

### For Base Coat on Wood Lath

When mixing mortar for the base coat where wood lath is used, no cement is needed, if the mortar is of good quality, made of sharp sand and lime. I find that the cement has a tendency to harden and to twist the lath, causing a bulging in the wall.

Portland cement for mortar to be used on metal lath is recommended, as it binds the key of the mesh very firmly. Too much cement will crack in the panels even on metal lath. Six to one gives good results.

### For Base Coat on Brick

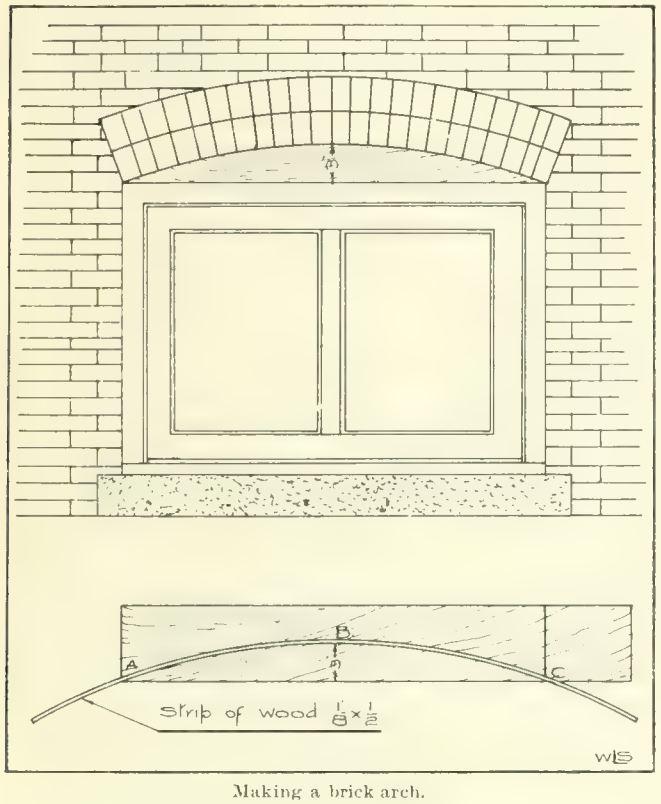
For base coat on brick: See that the face of the bricks are well soaked with water before coating with the mortar. Portland cement for mortar to be used on brick, about six to one, makes an A1 job.

### Exterior Cement Finish

For good cement mortar finish on brick: Use 4 bbls. sharp sand mortar to one bag Portland cement for the base coat; 6 bbls. sharp sand mortar to one bag Portland cement for the finish coat. This bonds better than a harder mixture.—E. J. Curry.

## Making a Brick Arch

In building brick houses, brick arches are used at side and back. When these are used, the bricklayers require a piece of wood nailed on top of the frame with the right curve. The easiest and quickest way to get this, is to get a strip of wood which will bend evenly.




Making a brick arch.

In the accompanying sketch "B" is the height, and is generally about 3 ins. in an ordinary basement window. Bend the strip so it will pass through the points A, B and C and draw the curve.—W. L. Spain.

## Painting Old Brick Walls

In the case of a large brick building, the walls of which had never before been painted, the mortar had fallen out of the joints in many places, and it was to be pointed up by a bricklayer. The walls were to be finished flat and a correspondent in a recent issue of the Painters Magazine asks how he can best stop the suction in the bricks and how he should treat the newly-painted portion of the surface to prevent the lime in the mortar from eating through and discoloring the work. In reply the authority in question says:

To avoid all risks of the lime in the mortar used in pointing the joints, it would be best to have the bricklayer do his pointing so that the mortar would not be on a level with the face of the bricks, but from one-sixteenth to three-thirty-seconds of an inch below. In that case you could putty up the joints, after applying your first or priming coat, thus stopping the suction in both bricks and joints. On hard pressed brick fronts, where the joints are not very open, pointing with mortar or cement is not resorted to, but the joints are filled in with colored putty after the first coat, and sometimes after the second coat, of paint.

As to advising how to stop suction in the bricks, it must be considered whether the brick in question is of the hard or soft variety, because in the latter case one more coat of paint is required than for hard brick. If you paint in imitation of red brick and the wall is composed of ordinary (not hard pressed) brick, use good Venetian red in oil, thinning with raw linseed oil and very little good drier, making a paint of medium consistency, which brush well into the surface. Then putty up as suggested with linseed oil and whiting putty, colored with dry Venetian red or mineral brown. The putty must not contain any cheap oils or it is liable to sweat out and make trouble. For the second coat, make the paint from Venetian red and yellow ochre or metallic brown in oil, according to the depth of shade desired for the final coat, adding about one-fourth as much of keg lead as you have of color and thin to brushing consistency with raw linseed oil three parts and turpentine one part, adding very little japan. Do not use turpentine substitute, if you wish to avoid trouble. Let this coat dry good and hard and see to it that there are no shiners, if you wish to make a good flat finish.

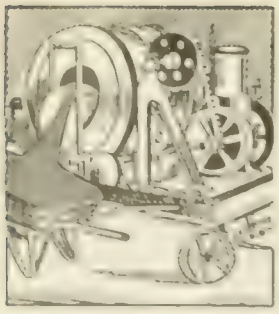
For this flat coat, unless you purchase flat brick color in paste form, to be thinned with turpentine, mix Venetian red and yellow ochre, or red and metallic brown, ground to stiff paste form, until you have the desired shade; then, for every twenty pounds of color in oil add five pounds fine dry whiting and thin for use with one-third best brown japan and two-thirds pure turpentine. If the color is to be buff, the first or priming coat should be keg lead, tinted with yellow ochre and Venetian red, thinned with raw linseed oil and small portion drier. The putty may be colored with yellow ochre. For second and third coat follow same rule as in the case of the red color.

## Toronto Architect Receives High Honor

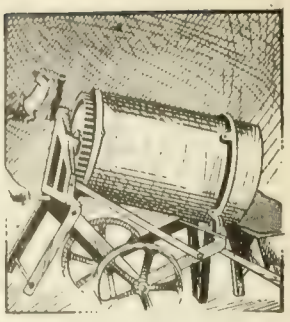
A high honor has been conferred on Mr. Frank Darling, one of Toronto's leading architects. The Royal Institute of Architects has awarded him the Royal gold medal, carrying with it the right to the letters "R.G.M." This is the first time this recognition for achievement in architecture has come to a Canadian. Mr. Darling, who is of the firm of Darling & Pearson, has been identified with the construction of many of the finest buildings in Canada. After the great fire in St. John's, Nfld., in 1892, Darling & Pearson jumped into the breach and helped construct over $2,000,000 worth of buildings. Some of their more important recent buildings and their cost are as follows: Toronto General Hospital, $3,500,000; Dominion Bank, Toronto, $1,500,000; C.P.R. Building, Toronto, $850,000; Canadian Bank of Commerce, Montreal, $900,000; Canadian Bank of Commerce, Winnipeg, $750,000.

## Safety Lights in Building

The use of matches and candles, etc., by repair men in making alterations or repairs in buildings is a dangerous practice. Numerous fires have been started by their use, and one of the most serious of recent fire losses is charged to the use of a candle to supply light while changing a gas meter. The gas pipe was broken, the gas caught fire from the lighted candle and caused a loss to property of over $150,000. For work of the above nature, the use of the storage battery electric lamp is strongly advocated. It is portable, the light is ample, and it is safe even amidst dangerous gases.



# Concrete Department



## Selection of Sand for Concrete

It may be said that specifications for sand used by the building trades have not changed for centuries, and it is sometimes believed that even in this enlightened age specifications in force are not as rigidly followed as in the earlier days when work was performed in a more primitive manner. Sand is such a common article of commerce and is usually so readily obtained that little thought has been given to the comparative value of sand, not alone as affecting the quality of the work, but also affecting the convenience and economy of construction from the contractors' standpoint. Some communities are more favored in having a better grade of sand than others, but in most any community there remains a wide selection, all of the sands, perhaps, costing about the same, if bought in the usual way, by the load or ton, delivered at the work, and yet a given sand may possess twice the strength of another sand from the same locality in the proportions of mortar or concrete commonly followed.

This may be further explained by stating that some sands in proportions of three parts of sand to one part cement will develop equal or greater strength than other sands in the proportions of two parts of sand to one part cement, or where the difference is not quite so marked, the better sand will develop a strength in three days equal or superior to the inferior sand at seven days, sometimes even for one month. The contractor is interested in having his concrete harden promptly, so that he can remove forms in as short a space of time as possible, and have them available for use again. If the concrete does not harden promptly so that the forms can be removed, and it is necessary to push the work, it means that additional lumber must be purchased, and thus directly affects the cost of the work. The cost of delays is always serious and never alike on different jobs, and the wise and prudent contractor, or even the small user of cement, will see that every precaution is taken to avoid delay and safeguard the results. It has been found that the real value of sand as a mortar ingredient, or for use in concrete, can be determined only by tests, and these may be anything from a simple practical test on the job to the more searching refinements of laboratory investigation. Unfortunately, the cost or inconvenience of having sand tested in the laboratory forbids this investigation in a great majority of cases, but it is perfectly possible for simple and practical tests to be made on the job. This may be performed somewhat in the following manner:

### Tests to Show Good Sand

Take by measure about one quart of Portland cement, well shaken down, and three quarts of sand, of the variety under consideration, and mix the sand and cement thoroughly dry, and then temper with clean water to about the consistency commonly used in the work. Put this wet mixture in a form—if of wood, have same previously wet; if of metal, this, of course, is not necessary; tamp or shake down, and allow to stand in a protected place without being disturbed, and examine at the end of one day, two days, or three days. If the sand is of good quality, the mortar should be hard, and possessed of considerable strength at the end of one day; at the end of forty-eight hours remove from the form, and test by striking with a hammer for strength and hardness. If several sands are under consideration and tested in the same manner, it will be easy to distinguish between the best and the inferior sands. Having selected a first-class Portland cement and the best sand available, it must be borne in mind that concrete in sidewalks or steps, where the area exposed to sunlight and air is large compared with the bulk of the work, the concrete should not be allowed to dry too quickly, and should be protected from the direct rays of the sun, if possible. It would greatly improve work of this character if sprinkled frequently, after first hardening, for several days following the completion of the work.

Another test of sand that is perhaps more suggestive than conclusive is to fill a pint bottle about half full of sand, then entirely full of water, shake thoroughly, and then allow to settle. If much discoloration results, it is certainly an indication of dirt or loam, and this should always be avoided. After settling, the fine loam or non-silicious material will be found on the top of the sand, and if in any quantity, this would suggest the need of further tests by combining with cement, as above described, before use. After having determined by the simple test, or the more elaborate laboratory tests if resorted to, the best grade of sand, it would be well to keep a sample of this sand to compare from time to time with the sand being delivered on the work, to see if the quality is maintained. It is well known that all sand pits furnish various grades of sand, and occasionally a poor lot may slip by without suspicion unless closely watched. The danger of using inferior sand is much lessened by the use of richer mixtures, and the difference in cost is nominal.

## Oil Paint on Cement

There is some difficulty in making paint adhere to cement, but if the cement is first washed with 1 per cent. sulphuric acid (one part concentrated acid of 100 of water), rinsed and allowed to dry thoroughly the paint will find the surface suitably prepared for adhesion. Or the cement may be covered with three coats of water glass (silicate of soda), one part to four of water, and then painted. A first coat of linseed oil varnish followed by the usual paint is effective.

## Portland and Roman Cement

In reply to a question as to the difference between Portland and Roman cements, the following replies are published in the "Surveyor":

Portland cement may be termed a composite cement, and Roman cement a natural cement. The former contains roughly 60 per cent. lime, 20 per cent silica, 5 to 10 per cent. alumina, and small quantities of various alkalies, oxides, etc. It is prepared by combining limestone rock and slag in a battery of washmills, warm water being added, forming what is known as slurry. The substance is then tested and screened, being afterwards conveyed to tanks provided with mechanical stirrers. It is then burnt in a rotary kiln, and passes to a rotary cooler in the form of clinker. This clinker is then crushed and passed successively through various mills until the required degree of fineness is obtained.

There are three distinct types of Portland cement—"quick-setting," which sets in from ten to thirty minutes; "medium-setting," taking from thirty minutes to two hours; and "slow-setting," which occupies from two to seven hours in the process.

Roman cement is prepared by calcining at a low temperature nodules found in the London clay and in the shale beds of the lias formation. It contains 40 per cent. of clay and is a rich brown in color. Whereas Portland cement weighs about 112 lbs. per bushel, Roman cement only weighs 75 lbs.. It has many disadvantages, being only one-third the strength of Portland cement, and having to be kept in barrels. If it is exposed to the atmosphere it becomes inert. It sets rapidly—in about fifteen minutes—and was largely used for tidal works, where rapidity of setting was very important; but lately it has been almost entirely superseded by the "quick-setting" Portland cement. (P. H., Middleton.)

These two cements differ in color: Portland cement has a greenish-grey color, and Roman cement has a rich red-brown color. Roman cement sets very rapidly, due to the presence, in high percentage, of alumina, and is only one-third the strength of Portland cement; it is much weakened by the addition of sand, which should never be used in a greater proportion than 1 to 1. Roman cement, on exposure to the atmosphere, absorbs carbonic acid and becomes useless; Portland cement, on the contrary, improves by being exposed to the air before being used, as the particles of free lime are rendered inert, while the setting quality of the cement itself is not affected. Roman cement is chiefly used for tidal and other work, where rapidity of setting is a necessity; but since the introduction of the more rapid-setting Portland cements, the use of Roman cement has been almost entirely superseded. (W. D., Dudley.)

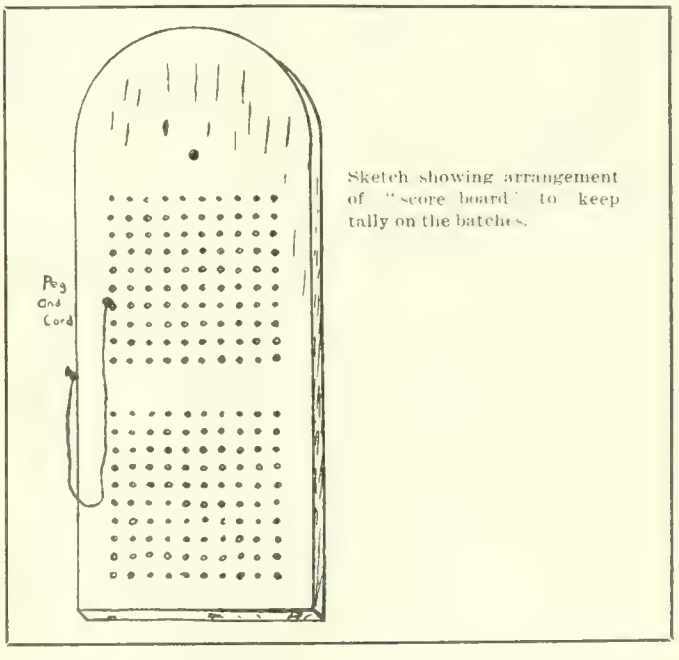
Cements are either natural or artificial. Roman cement is the best known natural cement in England. It is made by burning nodules containing some 30 to 45 per cent. of clay, found in the London clay. Portland cement is an artificial compound, made by mixing chalk and clay in water in the proportion of about 3 parts of chalk to 1 part of clay. The mixture is then dried and burnt in kilns, the resulting clinker being ground extremely fine, so that 90 per cent. of it will pass a sieve having 2,500 meshes to the square inch. The weight of Roman cement is about 75 lbs. per bushel, that of Portland cement being about 115 lbs. per bushel. They differ very much in color, Roman cement having a rich brown color, while Portland cement presents a greenish-grey color.

Roman cement sets in about fifteen minutes, but its ultimate strength is very small. It should never be exposed to the atmosphere, as it absorbs carbonic acid ($CO_2$) with ease, and thus becomes useless. Portland cement, on the other hand, must be thoroughly cool when used—all the lime in it thoroughly air-slaked—otherwise it may swell in the work when finished and cause much damage. In order to cool it, it should be spread out on a floor protected from the weather, and turned over daily for some weeks, so that every part of it may become thoroughly air-slaked. It will set either in the air or under water, becoming hard in twenty-four hours, attaining considerable tensile strength in seven days, and in course of time a strength far greater than that of any other cement. A good cement, after setting seven days under water, is expected not to break under a less stress than 355 lbs. per square inch.

Previous to the introduction of rapid-setting Portland cements, Roman cement was largely used for tidal work and other work where rapidity of setting is necessary. It is, however, rarely used for such work now. Roman cement is also used for stucco and plasterers' work in general, where great strength is not needed. It is not used for mortar or concrete. (T. W. P., Bexhill-on-Sea.)

## Device for Keeping Track of Concrete Batches

In a recent issue of Concrete-Cement Age, a writer tells of an ingenious device for keeping track of the batches in making concrete. This device was simply a board hung up over the mixer. The board was 12 in.




Sketch showing arrangement of "score board" to keep tally on the batches.

or 14 in. wide and 24 in. or 27 in. long with a rounded top and a hole, so that it could be hung on a nail. On the base of the board in two quadrangles small ¼-in. holes had been bored about 1 in. apart, 10 holes each way, so that there were two blocks of 100 holes each. A little wooden peg which was attached to the board with a string was the count and was moved over one hole each time a batch was dumped. This is a direct reading counter, and one that might prove useful on many concrete jobs.

## Dirt in Sand is Objectionable

As to whether or not dirt in sand is harmful depends upon the character of the dirt. The kind of impurity is really of more importance than the quantity. The presence of a small amount of clay in sand does not as a rule weaken or injure mortars or concretes, but it is generally considered that the presence of loam or dirt is objectionable.

## Concrete Columns and Fire

In his report upon the Edison fire, Leonard C. Wason, president of the Aberthaw Construction Company, Boston, laid particular stress upon the desirability of making interior columns either circular or octagonal in cross-section. His argument was based upon observation of the buildings which were gutted during that conflagration. To quote:

"Considering the intensity of the fire the effect upon the concrete was surprisingly slight. The corners of the square columns suffered most, being spalled off to an average depth of about four inches. The shape of the final column after chipping off dead material was practically a circle, owing to the loss of the corners. Neither of the two causes which combined in this spalling had to do with the dehydration of the cement in the concrete.

"The material is brittle, and under heat the temperature of the corners will rise more rapidly than the mass of the column, for the heat can penetrate from two sides. The result, in general, is the same as heating a piece of brittle glass on one side, where it will expand and crack away from the unheated balance of the sheet. In all the columns square twisted rods were placed vertically, some set well back into the concrete, some very close to the corners. When the heat reached these bars they expanded and buckled and helped to make a line of cleavage in the plane in which they occurred. The combination of buckling of the steel bars and strains in the concrete probably caused the serious spalling of the columns."

## Winslow Strength Computing Slide-Rule

The Winslow concrete computing slide rule, size 4x10 ins., made of hard waterproof fibre, has been placed on the market by Henry W. Tomlinson, 64 East Van Buren St., Chicago, Ill., who designed the mechanical construction of this invention of B. E. Winslow. The selling price, postpaid, packed in a neat case with full directions, is $3.00.

This rule is of special benefit to anyone interested in concrete construction. This rule is designed along similar lines to that for strength computing of steel and wood beams, and is for quickly calculating reinforced concrete beams, girders and slabs.

With it, the manufacturer claims, calculations may be made of concrete beams, etc., for any span, 6 in. to 70 ft. 0 in.; any load, 10 lbs. to 100,000 lbs.; any kind of loading, uniformly distributed, centre load, etc.; any bending-moment, 100 to 1,000,000 foot-pounds; any width, 6 in. to 20 ft. 0 in.; any depth, 1 in. to 16 ft. 8 in.; any percentage of steel reinforcing, .01 p.c. to 5 p.c.; any number of rods, 1 to 50; any bracing of rods, 1 in. up, on centres; any shape or size of rod, round, square, single wire, Am. Steel & Wire Co.'s triangle mesh, expanded metal, etc.; any "mix" of concrete; and any stress in the steel within reasonable limits.

## Space Requirements for Heating and Ventilating Plants

An extensive study of the space requirements for ventilation plants has been made, under the direction of the author, in connection with forty school buildings, with the result that it has been found that approximately 1¼ sq. ft. of floor area is required in the boiler room per 1,000 cu. ft. of contents of the building, with approximately the same allowance for fuel supply.

The space required for the fresh air plant, that is, the fans, heaters, air washers, motors, etc., varies from 1 sq. ft. to 1½ sq. ft. per 1,000 cu. ft. of space in the building, while the space required for the exhaust air plant is approximately half of that required for the fresh air plant. The height of these spaces depends upon the size of the building and its apparatus, varying from 7 to 14 ft. for the fan rooms and from 12 to 20 ft. for the boiler rooms. Usually the floor of the boiler room must be from 2 to 8 ft. below the level of the floor of the fresh air heater rooms, unless vacuum heating systems are used.

The usual size of the fresh air and exhaust flues for each standard 40-pupil class room is found to be 4 sq. ft. in area in both the fresh air and vent flues, although a number of systems are designed with 3 sq. ft. of fresh air and vent flue area each. These areas are increased or decreased as the number of pupils per room is increased or decreased.—D. D. Kimball in the School Board Journal.

Giving final finish with steel trowel.

## Coloring Concrete

In coloring concrete, it is essential that one use a pure mineral cement color that is free from clay, gypsum and organic matter. A good mix consists of five pounds of color to one bag of cement, except in green, when seven pounds should be used. For black, use two pounds in one to two and one-half mix.

## Effect of Adding Hydrated Lime to Cement Mortar

During the past year, Henry S. Spackman, a prominent engineer of Philadelphia, conducted a series of tests to determine how the addition of hydrated lime affected the change in volume of Portland cement mortar and concrete test pieces under different conditions of exposure. The results were announced at the annual meeting of the Lime Manufacturers' Association. Mr. Spackman considered that it had been sufficiently proved that a reasonable percentage (say 10 per cent.) of hydrated lime, added to cement mortar or concrete, increased the plasticity and impermeability of that mortar or concrete without materially affecting the strength. The effect on change in volume, however, had not been hitherto demonstrated.

In the opinion of the author, the test showed that variation in moisture content affects the volume of a mortar test piece more than change in temperature; but, when kept from contact with water other than moisture in the air, there is a marked tendency to shrinkage of the test piece, which tendency continues up to and beyond the six-month period. When the test piece is in constant or frequent contact with water, the general tendency is toward expansion in volume; but, with the draining off of the excess gauging water, there is a marked shrinkage at the 24-hour period, followed, in some cases, by expansion in 48 hours; and further shrinkage if test pieces are out of contact with water, and expansion if in contact with water. But the addition of hydrated lime, while increasing somewhat the maximum expansion and contraction when the test specimens are constantly exposed either to water or the dry air, markedly reduces the shrinkage due to the draining off of the surplus gauging water, and also the extent of the movement when the test piece is alternately wet and dry.

The conclusion of the investigation was that the addition of hydrated lime will be found advantageous under ordinary climatic conditions in concrete work generally, where it is exposed either to air or to fresh water; and concrete to which such additions have been made, besides being more impermeable, will show less change in volume under varying moisture content.

## Suggestions for Laying Terra Cotta

Terra cotta should always be set in either natural cement or Portland cement, mixed with sand, in about the same way as stone is set. As soon as set, the outside of the joints should be raked out to a depth of three-quarters of an inch to allow for pointing and to prevent chipping. The terra cotta should be built up in advance of the backing, one course at a time, and all voids, except those projecting beyond the face of the wall, should be filled with grout or mortar, into which bricks should be forced to make the work as solid as possible. All blocks not solidly built into the walls should be anchored with galvanized iron clamps, the same as for stonework, and, as a rule, all projecting members over 6 in. in height should be anchored in this way. After the walls are up, the joints should be pointed with Portland cement colored with a mineral pigment to correspond with the color of the terra cotta. The pointing is done in the same way as in stonework, except that the horizontal joints in all sills and washes of belt courses and cornices, unless covered with a roll, should be raked out about two inches deep, calked with oakum for about one inch, and then filled in with an elastic cement.

The weight of terra cotta in solid blocks averages 122 lbs. per cubic foot. When made in hollow blocks 1½ in. thick, the weight varies from 65 to 85 lbs. per cubic foot, the smaller pieces weighing the most. For pieces 12 to 18 in., or larger, on the face, 70 lb. per cubic foot should be a fair average. The crushing strength of terra cotta blocks in 2 in. cubes varies from 5,000 to 7,000 lb. per square inch. Hollow blocks of terra cotta, one foot high, unfilled, have sustained 186 tons per square foot. From these and other tests I would place the safe working strength of terra cotta blocks in the wall at 5 tons per square foot when unfilled, and at 10 tons per square foot when filled solid with brickwork or concrete. If it is desired to test the strength of special pieces, two or three small pieces should be broken from the blocks and ground to 1 in. cubes, and then tested in a machine. Should the average results fall much below 6,000 lb., the material should be rejected.

## Garage With Each Apartment in House

An American builder has let a contract for the erection of an apartment house containing a regulation automobile garage built in connection with each of its ten suites. Each of the proposed apartments will contain nine rooms and a garage. The garages on the respective floors are to be reached by an electric elevator, which in turn will be accessible by an incline at the rear of the building.

## What Readers Think of The Canadian Builder and Carpenter

Your paper improves with every issue.—W. H. Martin & Co., Toronto.

I am very pleased with your paper and have always found it very interesting to anyone who is in the contracting business.—H. Laird Paton, Montreal.

I am well pleased with the Builder and Carpenter. I consider I have more than received full value for my money and gained valuable information from the paper.—Fred Terry, Eglinton, Ont.

I got full value for my $1.00 in the past year. I have been fifteen years in the game, but I found several helpful points which were more than worth the dollar. —Ernest Hains, Camrose, Alta.

Architect—Now, don't you think it would be well to have a pergola attached to the west side of the house?

Newlyrich—On the west side of the house? I guess not. I want that pergola right in the parlor, and I don't want it attached to nothin'. Put it on wheels so the servants kin slide it out of the way when the guests are through playin' on it and want to tango.

# News of Builders' Exchanges

## "Build Now" Slogan in Saskatoon

The "Build Now" slogan has reached the city of Saskatoon, Sask., and the Builders' Exchange of that city has taken up the question of boosting the building trade in a somewhat novel manner, by the adoption of stickers to be placed on correspondence bearing slogans which are to draw attention of the public to the opportunities which now offer for building at the lowest possible cost.

The Trades and Labor Council of Saskatoon and several contractors in the city have entered into the spirit of the campaign and are using "Build Now" stickers on all their correspondence.

## Building Permits for the Month of May

| | May, 1915 | May, 1914 | 5 mos. 1915 | 5 mos. 1914 |
|---|---|---|---|---|
| **Eastern Cities** | | | | |
| [illegible] | $ 111,[illegible] | $ 13,976 | $ 359,548 | $ 458,638 |
| [illegible] | 70,[illegible] | 9,750 | 141,850 | 244,200 |
| [illegible] | 13,[illegible] | 25,648 | 24,360 | 30,043 |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Montreal | 529,167 | 185,950 | 42,200 | 1,150,950 |
| [illegible] | 124,[illegible] | 2,517,148 | 2,394,994 | 6,578,314 |
| Quebec | 554,827 | 125,950 | 168,700 | 266,820 |
| [illegible] | [illegible] | 462,495 | 1,223,278 | 1,253,014 |
| [illegible] | [illegible] | 113,490 | 93,515 | 450,780 |
| [illegible] | [illegible] | 126,195 | 78,475 | 278,940 |
| Chatham | 24,735 | 22,859 | 77,135 | 54,726 |
| Galt | 13,095 | 65,800 | 51,330 | 140,855 |
| Guelph | 62,465 | 69,905 | 154,200 | 315,829 |
| [illegible] | 22,41[illegible] | 47,341 | 79,024 | 159,275 |
| London | 184,350 | 310,885 | 407,485 | 941,550 |
| Ottawa | 357,500 | 478,475 | 669,400 | 1,826,650 |
| [illegible] | 15,79[illegible] | 167,588 | 49,509 | 746,449 |
| St. Catharines | 29,499 | 173,234 | 122,446 | 396,856 |
| Smiths Falls | 2,500 | 17,800 | 3,375 | 43,400 |
| Toronto | 807,769 | 2,827,513 | 2,377,359 | 10,541,086 |
| [illegible] | 25,[illegible]41 | 45,697 | 80,873 | 201,892 |
| Windsor | 60,580 | 244,785 | 166,800 | 335,695 |
| Peterborough | 15,940 | 105,260 | 39,057 | 237,740 |
| [illegible] | 8,[illegible]83 | 28,765 | 33,038 | 73,984 |
| St. Thomas | 19,750 | 82,695 | 51,160 | 224,026 |
| North Bay | 6,748 | 76,400 | 31,038 | 151,975 |
| Hamilton | 281,810 | 327,400 | 670,088 | 1,842,400 |
| Total 26 Eastern cities | $3,424,047 | $ 9,051,934 | $ 9,590,237 | $28,960,087 |
| **Western Cities** | | | | |
| [illegible] | | | | |
| Brandon | $ 6,100 | $ 78,830 | $ 17,475 | $ 160,875 |
| St. Boniface | 14,425 | 137,604 | 46,360 | 293,119 |
| Alberta— | | | | |
| Edmonton | 22,900 | 1,461,800 | 128,075 | 2,727,297 |
| Lethbridge | 5,390 | 73,040 | 10,300 | 188,765 |
| Red Deer | 400 | 2,300 | 1,000 | 27,025 |
| Medicine Hat | 2,510 | 228,140 | 45,180 | 624,200 |
| British Columbia— | | | | |
| Vancouver | 718,280 | 524,380 | 1,022,071 | 1,820,984 |
| Oak Bay | 5,700 | 34,475 | 16,650 | 185,351 |
| Kamloops | 4,100 | 9,115 | 8,720 | 88,225 |
| New Westminster | 6,730 | 74,462 | 26,315 | 123,897 |
| Victoria | 36,875 | 252,775 | 89,390 | 1,572,190 |
| Saskatchewan | | | | |
| Regina | 27,315 | 615,120 | 48,605 | 1,179,970 |
| Weyburn | 6,250 | 92,700 | 12,340 | 222,250 |
| Swift Current | 220 | 31,597 | 2,887 | 529,759 |
| Total 14 Western cities | $ 857,195 | $ 3,616,338 | $ 1,475,368 | $ 9,743,907 |
| Grand total 40 cities | $4,281,242 | $12,668,272 | $11,065,605 | $38,703,994 |

## Montreal Exchange Registers Protest

With the knowledge that many of the contracts in connection with public work in Montreal, Que., are being given to firms outside the country and city, David K. Trotter, secretary of the builders' exchange of that city, has sent the following letter to the City Council of Montreal:

"The question of the letting of contracts for city work at the present time is giving the board of directors of the Builders' Exchange much concern. The City Council, the Board of Control, and ourselves are at one, we believe, in our desire to give employment to the greatest number of workers at a fair wage, consistent with sound business principles and the general welfare of the city. We believe that this end would be materially advanced were all contracts for city works let to firms which are either of Montreal in their inception and operation, or of Canada. The City Council owes a duty not only to the workers, but also to our local contractors and building supply men who are amongst our largest ratepayers, and, who, relative to the capital invested in their business, have to maintain heavy staffs. If they do not get their rightful share of municipal work, a most unfair burden is imposed upon them. Moreover, in the treatment of their workmen, and the method of carrying out their contracts, Montreal and Canadian firms are more amenable to the force of public opinion.

"We notice with regret that in many cases city work has been given to American firms. It is a matter of common knowledge that many of these companies make use of American superintendents and foremen, and push the claims of American materials, and that the profits made are largely sunk in the States and in American enterprises. Others in a time of stress as the present close down and carry across the borders the proceeds of their operations here.

"In municipal matters a 'Made in Montreal' slogan is a fair corollary to a 'Made in Canada' one, and we would urge that for the successful and economical handling of city contracts our local contractors and supply men should have the first call."


Toronto Pressed Brick and Terra Cotta Co. of Milton, Limited

*Works and Office*
MILTON, ONT.

*Toronto Offices*
152-4 Bay Street

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**Pressed Brick**

***In All Colors***

Our manufacture has been used by principal Architects and Contractors for the past 25 years. And the quality of our bricks is backed up by one of the longest lists of satisfied customers held by any Brick Manufacturer. This is our recommendation of the grade of our Pressed Brick.

***The following is a list of a few of the new buildings which we have supplied and are supplying:***

New Y.M.C.A. Building, Brantford. New Y.M.C.A. Building, St. Thomas. New Y.M.C.A. Building, Guelph. New Husbandry Building, Ontario Agricultural College, Guelph. New Factory for The Buffalo Forge Co., Berlin. New Factory for The Consolidated Rubber Co. Berlin. New Factory The Guelph Lumber Co., Guelph. St. James' Lutheran Church, Elmira. New Factory for the Hinde & Dauch Paper Co., Toronto. The Massey-Harris Co., Limited, Toronto. The Robert Simpson Co., Limited, Toronto. The King Edward Hotel, Toronto. New Factory for The Galt Robe Co., Galt. New Post Office, Brantford. New Post Office, Bracebridge.

# Art-Kraft

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Roof your buildings with Art-Kraft Metal Shingles or Tile, and secure a roof that is fire-resistant, inexpensive, artistic, and which will resist the ravages of time and weather.

"Art-Kraft" Metal Tile will absolutely set your roof free from the expensive deterioration and objectionable limitations of wood shingles and actually cost less by comparison.

The first cost is the only cost—No repair bills.

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It will pay readers of The Canadian Builder and Carpenter to find out all about these Art-Kraft Metal Shingles; and to enable you to do this we have issued an attractive catalogue which we will send you free of charge. Send for it now while it is in your mind.

**The Sarnia Metal Products Co.**

**Sarnia Ontario**

# Price List of Building Materials—Revised to Date

EDITOR'S NOTE—Great care is exercised in obtaining prices for this department. They are as accurate as it is possible for us to make them. We know, however, that because of varying conditions, different dealers' prices are bound to vary somewhat; and our purpose in publishing this department is to give readers an idea of prices, rather than absolutely definite information.

In some cases a range of prices appears. This is given to cover the variation in quotations given by different dealers, and also to cover slight variations in conditions of measurement or purchases, which space will not permit us to specify in detail.

We will be glad to give readers prices on materials not appearing here (hardwood flooring and hardware trim for instance), and also the names of dealers from whom such materials can be obtained. Such information will be supplied promptly if you write us specifying in detail what is desired.

## PRICE AT MONTREAL

### Hemlock Lumber

| | |
|---|---|
| 2 x 4 in. to 2 x 12 in., 8 to 14 ft. | $24.00 |
| 2 x 4 in. to 2 x 12 in., 16 ft. | 26.00 |
| 2 x 4 in. to 2 x 12 in., 18 ft. | 28.00 to 30.00 |
| 1 in. hemlock No. 1 | 22.00 |
| No. 1 hemlock decking | 23.00 to 25.00 |
| No. 2 hemlock dimensions and 1 in. | 26.00 to 30.00 |

### Pine

| | |
|---|---|
| 1 in. common and better pine 8 to 12 in. wide, rough | $32.00 to 40.00 |
| 2 in. white pine, mill stock | 29.00 to 33.00 |
| ⅜ x 8 and 10 in. pine shelving | 36.00 to 45.00 |
| ⅞ x 12 pine shelving | 42.00 to 50.00 |
| No. 1 white pine flooring | 40.00 |
| No. 1 spruce flooring | 30.00 |
| No. 1 pine decking, D2S | 40.00 |
| No. 1 pine V. or beaded sheeting | 40.00 |
| No. 2 pine V. or beaded sheeting | 30.00 |

### Pine Trim for Paint Finish

| | |
|---|---|
| 4 in. casing, per 100 ft. | $1.75 |
| 5 in. casing, per 100 ft. | 2.10 |
| 8 in. pine base, per 100 ft. | 3.25 |
| 10 in. pine base, per 100 ft. | 4.20 |
| 4 in. pine window stool, per 100 ft. | 2.75 |

### Shingles, Lath Roofing, Etc.

| | |
|---|---|
| No. 1 pine lath | 5.00 |
| No. 2 pine lath | 4.50 |
| No. 1 spruce lath | 4.00 |

### Cedar Posts—Fence

| | |
|---|---|
| 5 in. at small end | 5c. foot |
| 7 in. at small end | 7c. foot |

### Hardware

| | |
|---|---|
| Nails, wire, common | $2.30 base keg |
| Nails, cut, common | 2.50 " " |
| Sash weights, cast iron | 1.50 per 100 lbs. |
| Tarred felt paper | .43 roll |
| Building paper | .35 roll |

### Brick, Tile, Terra Cotta, Sewer Pipe

| | |
|---|---|
| No. 1 dry pressed red bricks | 17.00 |
| No. 1 dry pressed buff bricks | 21.00 |
| Red stock bricks | 11.50 |
| Grey stock bricks | 12.00 |
| Wire cut brick for foundation work | 10.00 |
| Fire brick | 25.00 |
| Sewer pipe, 4 inch | 10c. foot |
| Sewer pipe, 6 inch | 15c. foot |

### Price at Montreal—*Continued*

### Cement, Plaster, Stone, Etc.

| | |
|---|---|
| Cement (bags extra) | 1.90 bbl. |
| Sand, for cement or brick work | .95 ton |
| Lime | .38 per 100 lbs |
| Hydrated lime | 10.00 |
| Mortar color | 5.00 bbl. |
| Plaster of paris | 2.35 |
| Crushed stone 2 in. | 1.40 |
| Crushed stone, 1 in. | 1.60 |
| Crushed stone, ⅜ in. | 1.75 |
| Hardwall plaster | $9.50 to 12.00 neat<br>6.50 sanded ton |
| Gravel | 1.35 yard |
| Hair (plaster) | .03 per lb. |

## PRICE AT TORONTO

### Hemlock Lumber

| | |
|---|---|
| 2 x 4 in. to 2 x 12 in., 8 to 14 ft. | $21.00 to 29.00 |
| 2 x 4 in. to 2 x 12 in., 16 ft. | 21.00 to 29.00 |
| 2 x 4 in. to 2 x 12 in., 18 ft. | 24.00 to 30.00 |
| 1 in. hemlock No. 1 | 22.00 to 26.00 |
| No. 1 hemlock decking | 24.00 to 28.00 |
| No. 2 hemlock dimensions and 1 in. | 18.00 to 23.00 |

### Pine

| | |
|---|---|
| 1 in. common and better pine 8 to 12 in. wide, rough | $25.00 to 33.00 |
| 2 in. white pine, mill stock | 29.00 to 34.00 |
| ⅜ x 8 and 10 in. pine shelving | 33.00 to 40.00 |
| ⅞ x 12 pine shelving | 45.00 to 48.00 |
| No. 1 white pine flooring | 34.00 to 37.00 |
| No. 1 spruce flooring | 27.00 to 32.00 |
| No. 1 pine decking, D2S | 26.00 to 31.00 |
| Spruce decking | 27.00 to 32.00 |
| No. 1 pine V. or beaded sheeting | 35.00 to 39.00 |
| No. 2 pine V. or beaded sheeting | 30.00 to 33.00 |

### No. 1 Common Yellow Pine

| | |
|---|---|
| 2 x 4 in. to 2 x 14 in., 10 to 16 ft. | $24.00 to 36.00 |
| 2 x 4 in. to 2 x 14 in., 18 to 20 ft. | 29.00 to 38.00 |
| 2 x 4 in. to 2 x 14 in., 22 to 24 ft. | 31.00 to 40.00 |

### Yellow Pine Finish

| | |
|---|---|
| 4/4 x 6, 8, 10 and 12 B. & B. smoke finish | $41.00 |
| 5/4 x " " " " | 45.00 |
| 6/4 x " " " " | 45.00 |
| 8/4 x " " " " | 45.00 |
| 4/4 x " " " steam finish | 45.00 to 50.00 |
| 5/4 x " " " " | 48.00 to 50.00 |
| 6/4 x " " " " | 48.00 to 50.00 |
| 8/4 x " " " " | 50.00 to 55.00 |

**NOTE TO READERS.** We would be glad to have suggestions from readers as to the extension or modification of this list.

## Price List of Building Materials—*Continued.*

### Price at Toronto—*Continued*

#### Pine Trim for Paint Finish

| | |
|---|---|
| 4 in. casing, per 100 ft. | $1.80 to 2.00 |
| 5 in. casing, per 100 ft. | 2.00 to 2.50 |
| 8 in. pine base, per 100 ft. | 2.75 to 3.25 |
| 10 in. pine base, per 100 ft. | 4.00 to 4.50 |
| 4 in. pine window stool, per 100 ft. | 3.00 |

#### Hardwood Trim, Flooring, Etc.

Quotations will be given on request.
See editor's note above.

#### Shingles, Lath Roofing Etc.

| | |
|---|---|
| XXX B. C. cedar shingles | $3.35 per M |
| N. B. extras | 4.00 |
| No. 1 pine lath | 5.00 to 6.00 per M |
| No. 2 pine lath | 4.75 to 5.00 |
| No. 1 spruce lath | 4.25 |
| Roofing | 1 ply—$1.60 per sq. |
| | 2 ply— 2.00 " |
| | 3 ply— 2.40 " |

#### Cedar Posts—Fence

| | |
|---|---|
| 5 in. at small end | .25 each |
| 7 in. at small end | .50 each |

#### Hardware

| | |
|---|---|
| Nails, wire, common | $2.35 cwt. |
| Nails, cut, common | 2.95 |
| Sash weights, cast iron | 2.00 |
| Tarred paper | .60 roll |
| Building paper, plain | .50 |

#### Glass

| United inches | Star | D.D. |
|---|---|---|
| Up 25 (per 100-ft. box) | $6.50 | 8.60 |
| 26-40 | $7.00 | 10.00 |
| 41-50 | 7.40 | 11 70 |
| 51-60 | 8.00 | 12.00 |
| 61-70 | 8.75 | 12.75 |
| 71-80 | 9.50 | 13.85 |
| 81-85 | 10.50 | 17.50 |
| 86-90 | | 18.85 |
| 91-95 | | 19.20 |
| 96-100 | | 22.75 |
| 101-105 | | 32.00 |
| 106-110 | | 36.00 |

Less 20 p.c. F.O.B. Toronto.

Wired glass ..... 18c. to 20c. per sq. ft.

#### Brick, Tile, Terra Cotta, Sewer Pipe

| | |
|---|---|
| No. 1 dry pressed red bricks | $14.00 to 18.00 pr M |
| No. 1 dry pressed buff bricks | 14.50 to 18.00 |
| Red stock bricks | 10.00 to 12.50 |
| Sand lime brick | 8.50 |
| Grey stock bricks | 10.50 to 12.50 |
| Sewer brick | 8.75 to 9.50 |
| Wire cut brick for foundation work | 8.00 to 9.00 |
| Porous terra cotta bricks | 12.00 to 15.00 |
| No. 1 enamelled bricks, all colors, from | 80.00 to 150.00 |
| Fire brick | 26.00 to 30.00 |
| Sewer pipe, 4 inch | 10c. foot |
| Sewer pipe, 6 inch | 16c. foot |
| Verandah post caps, 16 in. | 1.45 each |
| Verandah post caps, 20 in. | 1.75 " |
| Chimney caps, 1 flue in 1 piece | 2.00 " |
| Chimney caps, 2 flues in 2 pieces | 3.50 " |
| Chimney caps, 3 flues in 3 pieces | 5.00 " |

#### Cement, Plaster, Stone, Etc.

| | |
|---|---|
| Cement (bags extra) | $1.85 bbl. (1.55 in car lots) |
| Sand, for cement or brick work | 1.20 a yard |

### Price at Toronto—*Continued*

| | |
|---|---|
| Lime | .38 cwt. |
| Hydrated lime (Canadian) | 10.60 ton |
| Hydrated lime (American) | 11.60 " |
| Mortar color | black, 3; red, 2 |
| Plaster of paris | $1.50 to 2.50 |
| Crushed stone, 2 in. | 1.20 |
| Crushed stone, 1 in. | 1.25 |
| Crushed stone, ⅝ in. | 1.25 |
| Hardwall plaster | 9.10 |
| | 5.00 sanded |
| Gravel | 1.50 |
| Hair (plaster) | .07 lb. |

## PRICE AT WINNIPEG

#### Hemlock Lumber

| | |
|---|---|
| 2 x 4 in. to 2 x 12 in., 8 to 14 ft. | $29.00 |
| 2 x 4 in. to 2 x 12 in., 16 ft. | 29.00 |
| 2 x 4 in. to 2 x 12 in., 18 ft. | 29.00 |

#### Shingles, Lath Roofing, Etc.

| | |
|---|---|
| XXX B. C. cedar shingles | $4.00 & 3.50 per M |
| No. 1 pine lath | 5.75 per M |
| Metal lath | .16 to .20 |
| Roofing felt (2-ply) | 2.50 per roll |

#### Hardware

| | |
|---|---|
| Nails, wire, common | $3.70 per keg |
| Nails, cut, common | 3.70 |
| Sash weights, cast iron | 2.75 cwt. |
| Tarred felt paper | 1.00 per roll |
| Building paper | .75 |
| Insulating paper | 1.25 |

#### Glass

| United inches | Single | Double |
|---|---|---|
| Up 25 | $6.00 | 8.00 |
| 26-40 | 6.50 | 9.00 |
| 41-50 | 7.00 | 10.25 |
| 51-60 | 7.50 | 11.00 |
| 61-70 | 8.00 | 11.75 |
| 71-80 | 8.50 | 12.75 |
| 81-85 | | 15.75 |
| 86-90 | | 16.75 |
| 91-95 | | 17.75 |
| 96-100 | | 21.00 |
| 101-105 | | 23.50 |
| 106-110 | | 27.00 |

#### Brick, Tile, Terra Cotta, Sewer Pipe

| | |
|---|---|
| No. 1 dry pressed red bricks | $25.00 to 50.00 |
| No. 1 dry pressed buff bricks | 30.00 to 40.00 |
| Red stock bricks | 25.00 |
| Sand lime brick | 12.00 |
| Porous terra cotta bricks | 18.00 per M |
| No. 1 enamelled bricks, all colors, from | 100.00 |
| Fire brick | 52.50 |
| Oriental brick | 35.00 |
| Sewer pipe, 4 inch | .11 per ft. |
| Sewer pipe, 6 inch | .18½ per ft. |

#### Cement, Plaster, Stone, Etc.

| | |
|---|---|
| Cement (bags extra) | $2.60 per bbl. |
| Sand, for cement or brick work | 1.85 a yard |
| Lime | .34 per bu. |
| Hydrated lime | 12.00 per ton |
| Mortar color | .05 per lb. |
| Plaster of paris | .75 per bag |
| Crushed stone, 2 in. | 2.65 per yard |
| Crushed stone, 1 in. | 2.90 |

**NOTE TO READERS.** We would be glad to have suggestions from readers as to the extension or modification of this list.

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## Price List of Building Materials—*Continued.*

### Price at Winnipeg—*Continued*

| | |
|---|---|
| Crushed stone, ⅜ in. | 2.90 |
| Hardwall plaster | 13.00 per ton |
| Gravel | 1.85 per yard |
| Hair (plaster) | 1.25 per bale |

### PRICE AT VANCOUVER

#### Shingles, Lath Roofing, Etc.

| | |
|---|---|
| XXX B. C. cedar shingles | $2.20 & 2.10 per M |
| No. 1 pine lath | 2.25 per M |

#### Hardware

| | |
|---|---|
| Nails, wire, common | $3.25 per keg |
| Nails, cut, common | 4.25 |
| Tarred felt paper | .90 per roll |
| Building paper | .70 |

### Price at Vancouver—*Continued*

#### Brick, Tile, Terra Cotta, Sewer Pipe

| | |
|---|---|
| No. 1 dry pressed red bricks | $42.00 per M |
| No. 1 dry pressed buff bricks | 42.00 |
| Red stock bricks | 13.00 |
| Fire brick | 45.00 |
| Sewer pipe, 4 inch | .25 per ft. |

#### Cement, Plaster, Stone, Etc.

| | |
|---|---|
| Cement (bags extra) | $3.00 per bbl. |
| Lime | 1.35 per bbl. |
| Hydrated lime | 4.25 per bbl. |
| Plaster of paris | 4.50 per bbl. |
| Hardwall plaster | 14.50 per ton |
| Hair (plaster) | 14.50 per ton |

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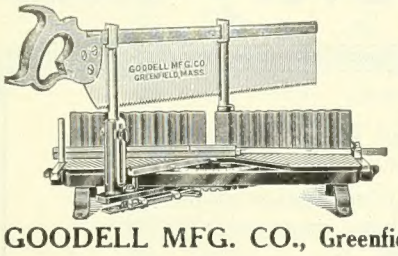


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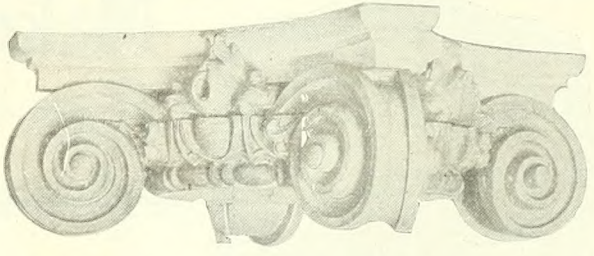

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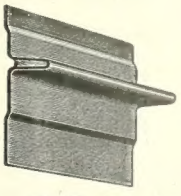

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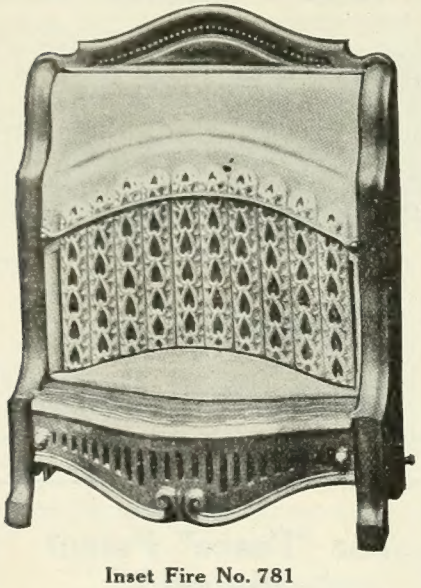

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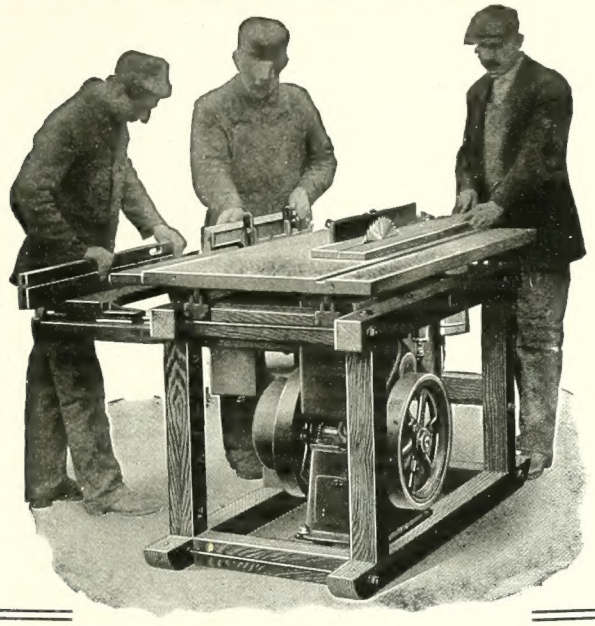

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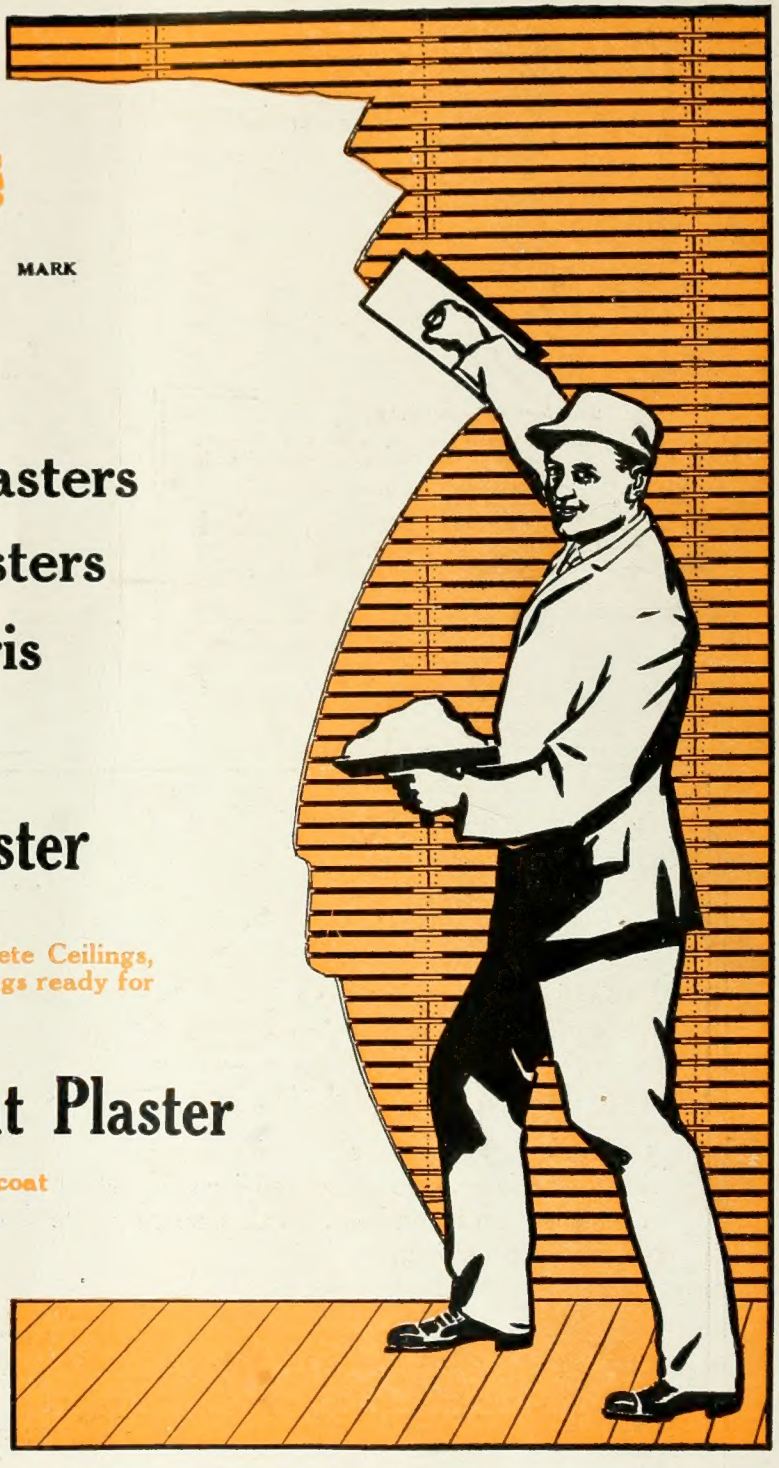

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